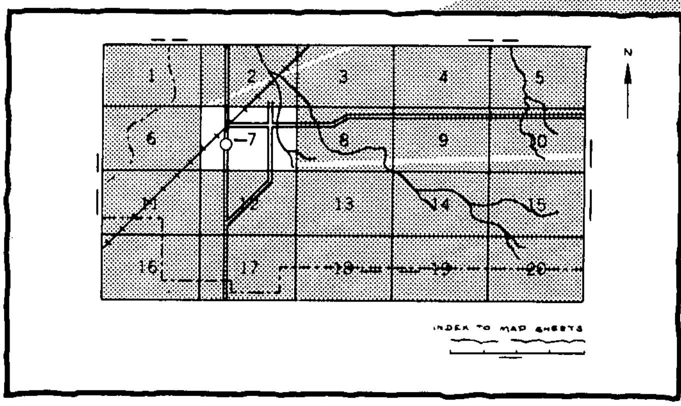
Soil Survey of City of Jacksonville Duval County, Florida

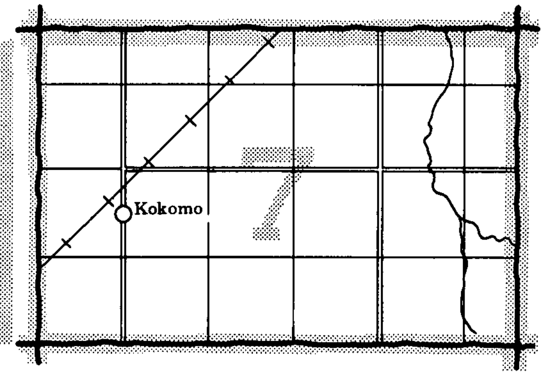
United States Department of Agriculture
Soil Conservation Service
in cooperation with

University of Florida
Institute of Food and Agricultural Sciences
and Agricultural Experiment Stations, Soil Science Department

HOW TO USE

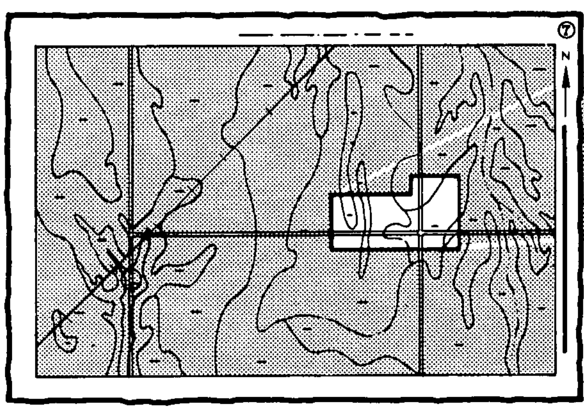
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

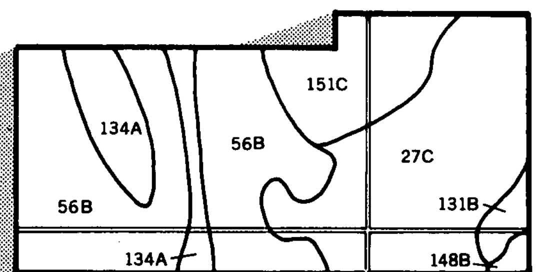




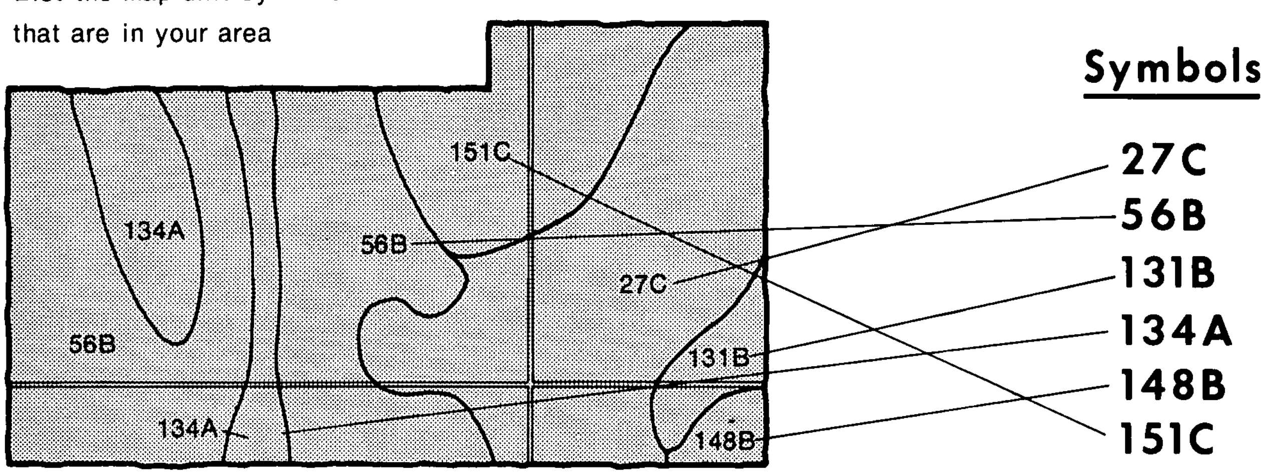
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



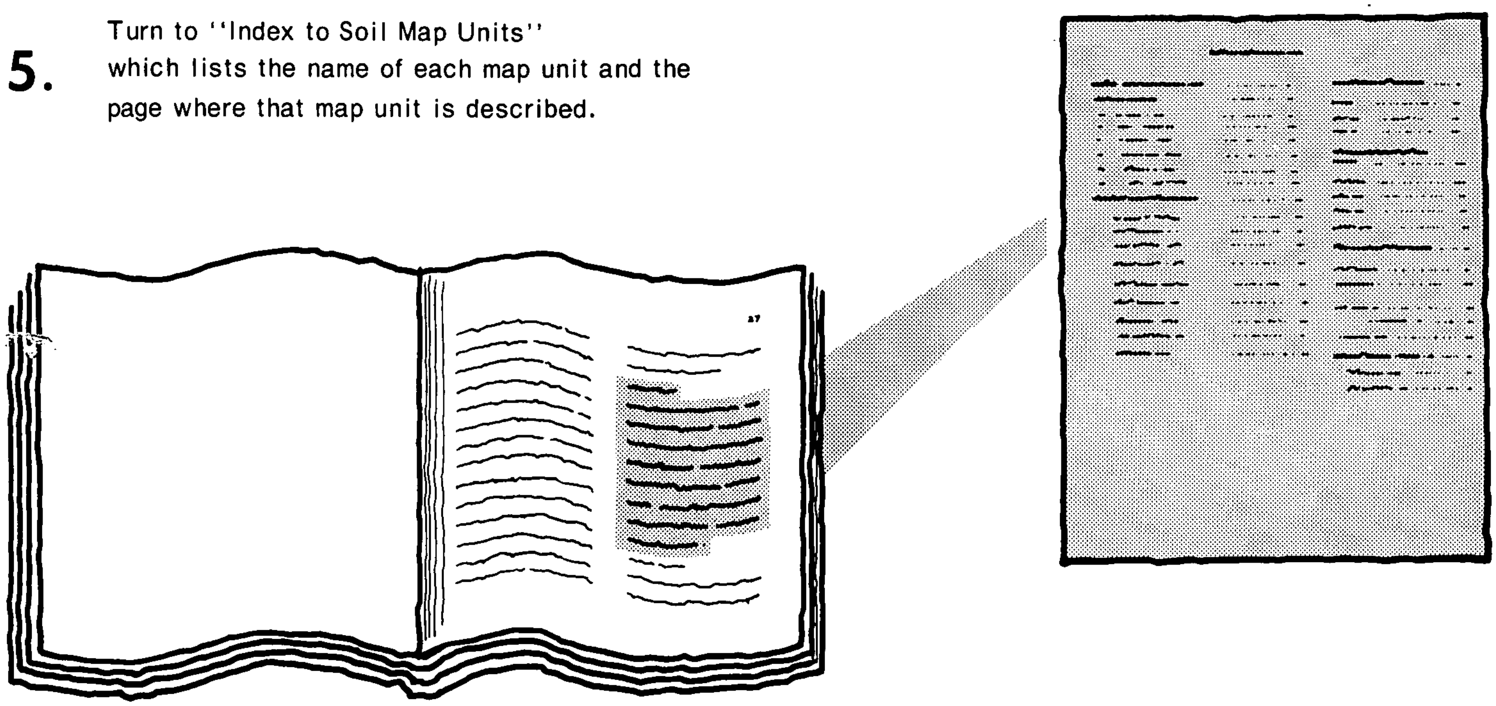


4. List the map unit symbols that are in your area

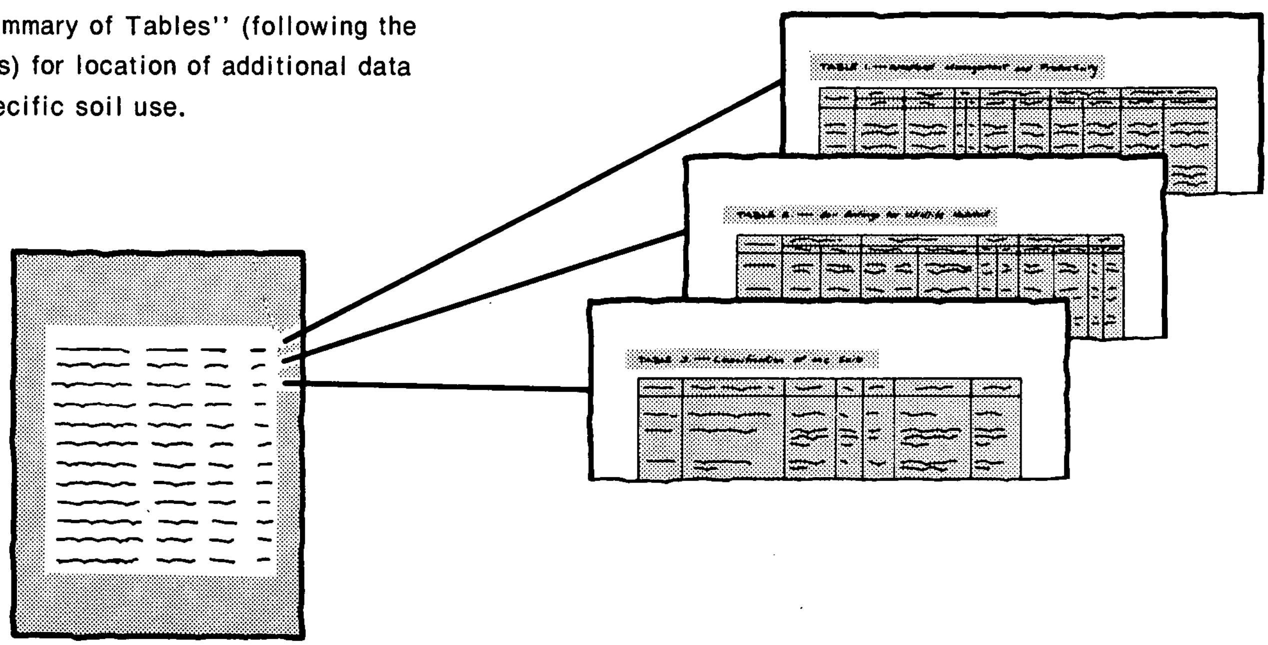


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1973-76. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1976. This survey was made cooperatively by the Soil Conservation Service and the University of Florida, Institute of Food and Agricultural Sciences and Agricultural Experiment Stations, Soil Science Department. It is part of the technical assistance furnished to the Duval Soil and Water Conservation District. The Jacksonville City Council contributed financially to accelerate the completion of fieldwork for the soil survey.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: Heart of the downtown section of the City of Jacksonville. The area is mapped as Urban land. (The use of the name "Independent Life" on the cover does not constitute endorsement by the federal government.)

Contents

Issued May 1978

Index to Soil Map Units

Summary of Tables

Foreword

The Soil Survey of the City of Jacksonville, Duval County, Florida contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

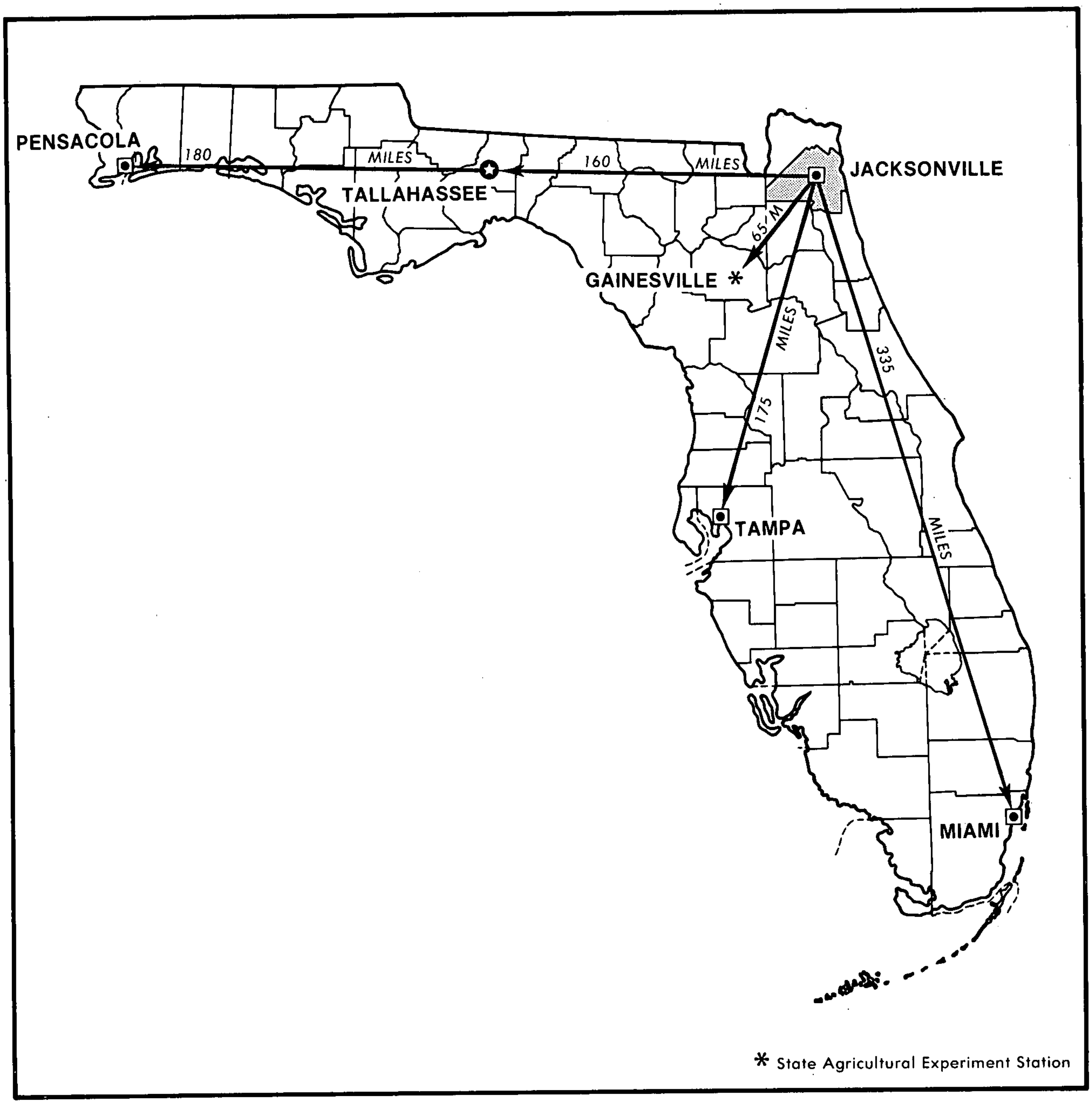
Many people assume that soils are all more or less alike. They are unaware that great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

We believe that this soil survey can help bring us a better environment and a better life. Its widespread use can greatly assist us in the conservation, development, and productive use of soil, water, and other resources.

William E. Austin

William E. Austin
State Conservationist
Soil Conservation Service



Location of the City of Jacksonville, Duval County, in Florida.

soil survey of city of jacksonville duval county, florida

United States Department of Agriculture
Soil Conservation Service
in cooperation with

University of Florida, Institute of Food and Agricultural Sciences and
Agricultural Experiment Stations, Soil Science Department

By Leon T. Stem, Hershel D. Dollar,
David A. Howell, Douglas L. Lewis,
Carol A. Wettstein, and Howard Yamataki, Soil Conservation Service

Others participating in the field survey were
Elmer M. Ward and Francis J. Wilhelm, Soil Conservation Service

THE CITY OF JACKSONVILLE, DUVAL COUNTY, is on the Atlantic Coast in the northeastern section of the Florida Peninsula. It is bordered on the north by Nassau County, on the west by Baker County, on the south by Clay and St. Johns Counties, and on the east by the Atlantic Ocean.

The land area within the county is 497,280 acres, or 777 square miles. The entire county, with the exception of the municipalities of Baldwin, Atlantic Beach, Neptune Beach, and Jacksonville Beach, is included within the metropolitan government of the City of Jacksonville. The county is about 32 miles long from north to south and 39 miles from east to west. Approximate distances by air from Jacksonville to the other principal cities in the State are shown on the map on the facing page.

Jacksonville is about 25 feet above sea level. Elevation in the county ranges from sea level to approximately 190 feet on the eastern edge of Trail Ridge. Average rainfall in Duval County is about 54 inches. The period of heaviest rainfall is June through October. The average temperature is approximately 56 degrees F in January and 82 degrees in August. For more information, see the section "Climate."

General nature of the survey area

In this section, environmental and cultural factors that affect the use and management of soils in the survey area are discussed. The factors discussed are history and development; archeological factors; climate; farming; water resources; transportation; and recreation.

History and development

In 1513, Juan Ponce de Leon landed on the coast of northeast Florida and was credited with its discovery. Ayllon and Quexos, two Spanish explorers, in 1520 discovered what is now the St. Johns River and named it the River of Currents because of its swift flow. In 1562, Jean Ribault, A French leader and explorer, landed at the mouth of this river and called it River of May (*11*). In 1564, French Huguenots built Fort Caroline on the south bank of the St. Johns River. It was promptly destroyed by the Spanish, led by Pedro Menendez. In 1763, Great Britain acquired Florida and began developing the northern part of the territory. The famous "King's Highway" passed through what is now the city of Jacksonville, known at that time as Cowford.

Favored by its location near the Atlantic Ocean and its good access to a large agricultural and timber region, Jacksonville became an important trade center and deepwater port. By the 1870's the city was gaining fame as a health resort, and hotels began to dominate its skyline. Railroads were extended into the area before and during the Civil War, and steamboats began to use the port for both local and out-of-state commerce.

Jacksonville continued to grow in spite of a severe yellow fever epidemic and a great fire which nearly leveled the city in 1901 (*3*). The city is now a regional center for rail, highway, and water transportation as well as a center for financial and insurance institutions. In 1950, the population was 304,029; in 1960, it was 455,211; in 1970, it was 528,865; and in 1975, it was estimated by the Jacksonville Chamber of Commerce to be 577,900.

Since the end of the Second World War, industrial development has increased greatly (fig. 1). Machinery and transportation equipment, chemicals, bedding, fabricated metals, and construction materials are manufactured. Large amounts of timber and pulpwood are major products. Large numbers of the population are employed in construction, and many more are employed in the shipping industry along Jacksonville's waterfront.

Community facilities have expanded rapidly since 1968. All parts of the county are adequately served by electric and telephone facilities. Natural gas is available in many places.

Archeological factors

LYNN NIDY, field archeologist, Florida Division of Archives and History, helped prepare this section.

Soils influence kinds and amounts of vegetation and amounts of water available and in this way indirectly influence the kinds of wildlife that inhabit an area.

Soil properties undoubtedly had an influence on site selection. Factors such as wetness, flood hazard, slope, permeability, and fertility for crop production were important criteria for site selection. The early inhabitants of the area, with limited knowledge of soils and limited ability to alter the soil, had to use the soil in large part as it was.

Inhabitants of the area at one time were probably hunters and gatherers, that is, they did not plant crops but gathered wild plants and hunted game. But even their subsistence practices were indirectly influenced by soil distribution and its relationship to the environment.

When Europeans first arrived in the area, they found the native Americans planting crops (*12*).

Archeological site distribution in the area is closely related to topography as well as soil distribution. According to Fairchild (*6*): "The topography in Duval County is mostly low, gentle to flat, and composed of a series of ancient marine terraces. The highest altitude is about 190 feet above sea level in the extreme southwest corner of the county, along the eastern slope of a prominent topographic feature known as 'Trail Ridge.' Trail Ridge is a remnant of the highest, ancient marine terrace (Coharie) in Duval County. The terraces are parallel to the present Atlantic shoreline and become progressively higher from east to west."

The moderately well drained and excessively drained soils, such as the Ortega, Kureb, Kershaw, Cornelia, and Blanton soils, are located on the higher portions of individual marine terraces.

There are 36 large ceremonial sites recorded to date in the county, 35 of which occur on the moderately well drained to excessively drained soils. Of the total 150 archeological sites recognized in the county, only those directly related to marine food acquisition are located on very poorly drained soils, such as Tisonia or Maurepas soils.

Many of the soils related to marine food acquisition are soils that have been modified by man. The inhabitation of the site has actually created fertile soils, that is, the sites are in areas that were originally low, wet, poorly drained, unproductive sandy soils, but the sites developed because of easily exploited abundant food sources. Today, the areas, because of midden accumulation, are higher than the surrounding areas. The soils are better drained and more fertile. These areas are quite visible on aerial photographs because of the different vegetation of surrounding areas.

The relationship of the settlement of the area to good farming lands is clearly indicated by the locations of the early plantations. Generally the plantations were located on prehistoric Indian sites—for example, the Greenfield, the Fitzpatrick, the Kingsley, and the Houston plantations.

The first European settlers in the Duval County area lived on the high ridges along the south bank of the St. Johns River and on the islands around its mouth. Except for sawmill grants in the interior of the county, the early settlements were on moderately well drained or excessively drained soils.

An important exception to this trend was the settlement in the late 18th century of the area on the northwest bank of the St. Johns River. This settlement was later known as Cowford, and much later as the city of Jacksonville. This area was settled because the St. Johns River is at its narrowest, and the area was a popular fording point. This area continued to develop, and in 1882 the city of Jacksonville was officially founded.

Conclusive archeological evidence proves that soils distribution and topography had a strong influence on early settlement patterns in Duval County.

Climate

The climate in Duval County is characterized by long, warm, humid summers and mild winters. The Atlantic Ocean and the Gulf Stream have a moderating influence on maximum temperatures in summer and on minimum temperatures in winter. This influence is pronounced along the coast but diminishes noticeably a few miles inland.

Rainfall is heaviest in summer; about 65 percent of the annual total falls from June through October in an average year. The other 35 percent is more or less evenly distributed throughout the remainder of the year. Maximum temperatures show little day-to-day variation, and temperatures as high as 96 degrees F occur at least 1 day a month during summer. Minimum temperatures in winter vary considerably from day to day, largely because of periodic invasions of cold, dry air moving southward from across the continent. Summarized climatic data (*17*, *19*), based on records collected at the Jacksonville International Airport, are shown in table 1. Extreme temperatures during the period 1941 to 1970 were a high of 105 degrees in July 1942 and a low of 12 degrees in December 1962 (*19*).

In many areas, particularly near the water, temperatures seldom drop below freezing. Temperatures fall to freezing or below about 12 times a year, but it is rare when the temperature does not rise above freezing during the day; in fact, there have been only five occasions on which it failed to do so (*19*). Most notable of these was the great freeze of February 13, 1899, when the maximum for the day was only 27 degrees. Freeze data (*18*), shown in table 2, were taken at the Jacksonville International Airport. The average date of the first freeze is December 16, and the average date of the last is February 6.

Most rainfall in summer occurs as afternoon and evening showers and thundershowers; sometimes, 2 to 3 inches fall within an hour. Daylong rains in summer are rare. Generally, they are associated with tropical storms. Rainfall in fall, winter, and spring is seldom as intense as in summer. According to Environmental Data Service at the Jacksonville International Airport Weather Station, rainfall in excess of 8 inches during a 24-hour period can be expected sometime during the year in about 1 year in 10.

Hail falls occasionally during thunderstorms, but hailstones are usually small and seldom cause much damage. Snow is rare in Duval County; when it occurs, it usually melts as it hits the ground. Snow has fallen in measurable amounts only twice since 1871: 1.9 inches on February 12-13, 1899, and 1.5 inches on February 13, 1958.

Tropical storms can affect the area any time from early in June through mid-November. The chances of winds reaching hurricane force, 74 miles per hour or greater, in Duval County are about 1 in 14, according to Environmental Data Service at the Jacksonville International Airport Weather Station. The copious rains and the flooding associated with these storms can cause considerable damage.

Extended periods of dry weather can occur in any season but are most common in spring and fall. Dry periods in April and May are generally shorter than those in the fall but tend to be more serious; temperatures are higher and the need for moisture greater.

Prevailing winds are generally northeasterly in fall and winter and southwesterly in spring and summer. Wind movement, which averages slightly less than 9 miles per hour, is 2 to 3 miles per hour higher in the early afternoon hours. It is slightly higher in spring than in other seasons of the year.

Farming

Citrus was one of the first crops grown by the early settlers of Duval County, but severe freezes in 1894 and 1895 and in ensuing years stopped this enterprise. Several small citrus nurseries are located in the Mandarin section, but no large commercial citrus groves exist today. Other horticultural nurseries and ferneries are expanding due to the pressures of a rapidly growing urban area.

Trees, the largest acreage usage in the county, grow on approximately 324,000 acres, or approximately 65 percent of the total land area of the county. Production is primarily from pine trees, but some hardwoods are harvested. Pulpwood is the major product, but sawtimber, poles, and some naval stores are produced.

Milk production has declined over the past decade, according to the County Extension Service of Duval County. In 1975, there were 32 dairies ranging in size from 150 to 5,000 acres. These dairies supported approximately 16,000 producing dairy cattle. An urban tax base and pressures from urban development preclude any large increase in this industry. At present, approximately 10,000 acres are used for this purpose.

There are small, but locally important, herds of beef cattle and swine in Duval County. In 1975, there were 8,000 beef cattle and 12,000 swine.

The poultry industry has declined over the past decade because of urban expansion, and the large producers have moved to outlying rural counties. Small flocks are produced, but production is limited.

Beekeeping is a minor industry, and many producers maintain 50 to 100 hives. The total number of hives, however, is small.

Water resources

Large quantities of surface water are available at many locations in Duval County (*10*). The St. Johns River and its major in-county tributaries, the Trout, Ortega, and Broward Rivers and Julington Creek, are potential sources of water for industrial uses. However, the St. Johns River and the lower reaches of its major in-county tributaries are brackish and generally not suitable for agricultural uses, or as a supply of potable water.

The deep artesian wells that penetrate the Floridian Aquifer constitute the major source of fresh potable water in Duval County. However, a substantial quantity of water is also obtained from shallow wells (20 to 200 feet deep) that penetrate the shallow aquifer system. Because of increased growth in population and industry, the demands for fresh water have increased. As a result, the shallow aquifer is becoming more important as an additional source of potable water.

The Floridian Aquifer ranges from about 500 feet to more than 1,000 feet in thickness. The top of the limestone is 260 feet to more than 600 feet below the surface in Duval County. Some wells drilled into the aquifer yield more than 5,000 gallons per minute. The quality of the deep aquifer water varies from good in or near the recharge areas in the western part of the county to poor along the St. Johns River and near the coast where high concentrations of chloride and other constituents render the artesian waters unsuitable for most uses. An exception is in the Jacksonville urban area, where good-quality water has been located in formations at a depth of about 2,100 feet.

All the formations that overlie the Ocala Limestone of Eocene age comprise the shallow-aquifer system in Duval County. These formations range in age from Miocene to Holocene. The formations that lie above the Hawthorn Formation, of Miocene age, have not been given names and are referred to by their geologic age. In ascending order, they are the Hawthorn Formation, middle Miocene age; upper Miocene or Pliocene deposits; and Pleistocene and Holocene deposits.

Water from most wells in the shallow aquifer system and in the Floridian Aquifer system is suitable for domestic use and for most industrial uses (*9*). Water from wells in the shallow system is generally softer and contains less dissolved mineral matter and more iron than water from wells in the deeper Floridian Aquifer system. Wells in the Floridian Aquifer system closest to the recharge area in the southwestern portion of the county generally contain softer water that contains less dissolved mineral matter than do wells in the central and northern parts of the county.

Transportation

Most of Duval County is served by good transportation facilities. Several county, State, and Federal highways provide ready access between population centers within the county and the State; in addition, Jacksonville is a rail center and the headquarters of one of the major railroads (fig. 2). The St. Johns River and the Trout and Ortega Rivers are crossed in several locations by a modern system of bridges. Airline service is available, both commercial and private, as well as rail and bus service. The Intercoastal Waterway provides an inland water route through the county. Blount Island, Dame Point, Eastport, and downtown Jacksonville are deepwater ports where commercial ships load and unload cargo (fig. 3). The U.S. Naval Station in Mayport has a deepwater basin where naval vessels dock.

Recreation

Recreation in Duval County is of considerable importance. Areas include beaches, national monuments, State and city parks, campgrounds, golf courses, swimming pools, tennis courts, riding stables, zoos, fishing areas, boating areas, football and baseball stadiums, theaters, museums, and suburban neighborhood playgrounds.

The major recreation areas are located near the urban population. Recreational activities are usually centered around the many miles of coastal beaches and large expanses of inland waters in the Broward, Trout, Ortega, and St. Johns Rivers, Thomas Creek, and the Intercoastal Waterway. The beaches attract many visitors, and surfing is popular. Boating, water skiing, and fishing are popular on all the inland rivers as well as on the Intercoastal Waterway. Deep sea fishing is popular.

Many of the larger apartment complexes have playgrounds, tennis courts, swimming pools, basketball and volleyball courts, and indoor recreation areas. The city and county governments have developed many areas specifically for recreation; these areas are strategically located to provide access to as many people as possible. Beachfront parks, tennis courts, baseball diamonds, swimming pools, boating areas, zoos, golf courses, and over 300 neighborhood parks are some of the recreational facilities.

Recreational potential in Duval County is high. The climate is conducive to out-of-doors, recreational activities.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local

specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soils in the survey area vary widely in their potential for major land uses. Table 3 shows the extent of the map units shown on the general soil map and gives general ratings of the potential of each, in relation to the other map units, for major land uses. Soil properties that pose limitations to the use are indicated. The ratings of soil potential are based on the assumption that practices in common use in the survey area are being used to overcome soil limitations. These ratings reflect the ease of overcoming the soil limitations and the probability of soil problems persisting after such practices are used.

Deciding which land should be used for suburban development is an important issue in the survey area. Each year, a considerable acreage is being developed for suburban and urban uses in Duval County. About 120,000 acres, or nearly 24 percent of the survey area, consists of suburban or urban areas.

In table 3, each map unit is rated for *community development, improved pasture*, and *pine woodland.* Community development includes residential developments with or without community sewage service. Improved pasture refers to managed stands of pasture grasses or of grasses and clovers that have been seeded, as opposed to native range plants. Pine woodland refers to land that is producing or is potentially capable of producing either pine trees native to the area or introduced species.

For a further discussion of soil potentials and definitions of the different classes of soil potential, see the section "Soil maps for detailed planning."

Soils of the sand ridges

The three units in this group consist of excessively drained to somewhat poorly drained, nearly level to moderately steep soils that are sandy to a depth of 80 inches or more. These soils are on ridges along the St. Johns River and along the Atlantic Coast.

1. Aquic Quartzipsamments-Fripp

Nearly level to sloping, excessively drained and moderately well drained soils that are sandy throughout; some have been modified by dredging and earthmoving operations

This map unit is made up of a series of long ridges and nearly level areas that have been reworked by man. It is mostly along the coast near the Atlantic Ocean. The natural vegetation is mostly sea oats, scrub oak, and cabbage palm on the ridges and side slopes, and waxmyrtle in the swales. Vegetation is mostly sparse.

This unit makes up about 4,975 acres, or about 1 percent of the county. It is about 55 percent Aquic Quartzipsamments, about 21 percent Fripp soils, and 24 percent soils of minor extent.

Aquic Quartzipsamments are nearly level to gently sloping and moderately well drained. They are in the swales except around the Mayport U.S. Naval Air Station, where they have been cut and filled or reworked by manmade dredging and earthmoving operations. Where they have not been reworked, the surface layer is light gray fine sand. The subsurface layer is white fine sand to a depth of 20 inches, and mixed brown and white fine sand extends to a depth of 80 inches or more. Where the soils have been reworked, the mixed soil material is light gray, white, grayish brown, gray, light yellowish brown, very pale brown, brownish yellow, and yellowish brown fine sand and is not in an orderly sequence of horizons. In some places, the soil material has uniform color throughout.

Fripp soils are gently sloping to sloping and excessively drained. They are on the ridges and side slopes. The surface layer is grayish brown fine sand about 6 inches thick. Below is very pale brown fine sand that contains horizontal bands of heavy minerals and that extends to a depth of 80 inches or more.

Of minor extent in this map unit are Arents, Cornelia, and Kureb soils and Beaches.

Except where the soils have been reworked, areas are mostly still in natural vegetation.

These soils have low potential for pine woodland because of droughty conditions.

Potential is low for improved pastures. Droughty conditions restrict root development. Droughty conditions and soil blowing on the Fripp soils limit establishment and maintenance of pasture grasses.

These soils have medium potential for community development mainly because of slope and flooding. Construction sites should be designed to fit the natural terrain and restricted to the back dune portion of the landscape to afford protection from flooding during unusual weather conditions.

2. Kershaw-Ortega

Nearly level to sloping, excessively drained and moderately well drained soils that are sandy throughout

This map unit is made up of broad, nearly level to sloping ridges interspersed with narrow, wet sloughs that generally parallel the ridges. It is along the St. Johns River and extends inland about 4 miles to the north of the river and about 9 miles to the south. The natural vegetation is turkey oak, blackjack oak, and second growth slash pine and longleaf pine. Native grasses are pineland threeawn, panicum, and grassleaf goldaster.

This unit makes up about 29,835 acres, or 6 percent of the land area in the county. It is about 55 percent Kershaw soils, 35 percent Ortega soils, and 10 percent soils of minor extent. About 40 percent of the Kershaw soils in this association occur in a complex with Urban land.

Kershaw soils are on the higher ridges. They are gently sloping to sloping and excessively drained. Typically, they have a surface layer of very dark gray fine sand about 3 inches thick. Below this to a depth of about 51 inches is light yellowish brown fine sand, and to a depth of 80 inches or more there is brownish yellow fine sand.

Ortega soils are on lower ridges. They are nearly level to gently sloping and are moderately well drained. Typically, the surface layer is grayish brown fine sand about 5 inches thick. Below that there is very pale brown fine sand that extends to a depth of about 48 inches and white fine sand that extends to a depth of 82 inches or more.

The minor soils are Pottsburg, Alpin, and Ridgeland soils.

The soils in this map unit have low potential for pine trees because of droughty conditions.

Potential is low for improved pasture. Droughty conditions restrict root development.

These soils have high potential for community development (fig. 4). Ortega soils, however, have medium potential for use as septic tank absorption fields, but this potential can be improved by adequate water control. Supplemental irrigation helps establish ground cover on homesites and recreational sites.

3. Mandarin-Kureb

Nearly level to moderately steep, somewhat poorly drained and excessively drained soils that are sandy throughout

This map unit is made up of slightly elevated areas of flatwoods surrounded by or adjacent to broad ridges. The most extensive area is a long, broad area between the Intercoastal Waterway and the Atlantic Coast, south of the St. Johns River. Another area occurs south of Blount Island along the St. Johns River, and other areas occur south of Nassau Sound. In the elevated flatwoods areas, the second growth vegetation is slash pine, scrub oak, sawpalmetto, rosemary, and dwarf huckleberry. Native grasses include various bluestems. The broad ridges have natural vegetation of scrub oak, greenbrier, and scattered sawpalmetto. Native grasses include pineland threeawn, creeping bluestem, lopsided indiangrass, panicum, and paspalum.

This unit makes up about 14,920 acres, or about 3 percent of the county. It is about 70 percent Mandarin soils, about 15 percent Kureb soils, and about 15 percent soils of minor extent.

Mandarin soils are nearly level and somewhat poorly drained. Typically, they have a surface layer of dark gray fine sand about 4 inches thick. The subsurface layer is fine sand about 22 inches thick; it is light brownish gray in the upper 4 inches and light gray in the lower 18 inches. A layer of dark colored, weakly cemented fine sand occurs at a depth of about 26 inches. Light gray fine sand is at a depth of 46 inches. Another dark colored, weakly cemented layer occurs at a depth of about 73 inches and extends to a depth of 80 inches or more.

Kureb soils are gently sloping to moderately steep and excessively drained. Typically, they have a surface layer of dark gray fine sand about 4 inches thick and a subsurface layer of white fine sand about 12 inches thick. Below this to a depth of 60 inches there is yellow fine sand. This is underlain by very pale brown fine sand that extends to a depth of 82 inches or more.

The minor soils are Ortega, Leon, and Stockade soils.

Large areas of this map unit are still in natural vegetation. Presently, a moderate acreage is undergoing urban development.

These soils have medium potential for use as pine woodland mainly because of droughty conditions.

Potential is low for improved pasture because of droughty conditions and low fertility.

These soils have high potential for community development. Seasonal wetness, high permeability, and slope affect the use of this map unit for community development. On the Mandarin soils, a properly designed water control system can be used to lower the seasonally high water table to acceptable limits for septic tank use. On the Kureb soils, supplemental irrigation systems can be used to alleviate droughty conditions. In the sloping areas, buildings should be designed to fit the natural terrain.

Soils of the flatwoods

The three map units in this group consist of moderately well drained to very poorly drained, nearly level to gently sloping, sandy soils. Most of the soils have a dark colored, weakly cemented, sandy layer that is underlain by sandy or loamy material. These units are well distributed throughout the county.

4. Leon-Ortega

Nearly level and gently sloping, moderately well drained and poorly drained soils that are sandy throughout

This map unit is made up of broad areas of flatwoods interspersed with narrow to broad ridges. It occurs along the southern and eastern banks of the St. Johns River and throughout the southern part of the county. The natural vegetation of the flatwoods is slash pine, longleaf pine, sawpalmetto, gallberry, waxmyrtle, and fetterbush. Native grasses include lopsided indiangrass, pineland threeawn, panicum, and bluestems. On the ridges, the natural vegetation consists of turkey oak, blackjack oak, second growth slash pine and longleaf pine, and scattered sawpalmetto. Native grasses include pineland threeawn, low panicums, and grassleaf goldaster.

This unit makes up about 34,810 acres, or about 7 percent of the county. It is about 40 percent Leon soils, about 35 percent Ortega soils, and about 25 percent soils of minor extent. Some of the Leon soils occur in a complex with Urban land.

Leon soils are nearly level and poorly drained. They occur in the broad flatwood areas. Typically, they have a surface layer of fine sand that is very dark gray in the upper 5 inches and dark gray in the lower 3 inches. The subsurface layer is gray fine sand. A layer of dark colored, weakly cemented fine sand occurs at a depth of about 18 inches, and a layer of dark brown fine sand occurs between depths of 37 and 45 inches. Below this, to a depth of 80 inches or more, there is another layer of dark colored, weakly cemented fine sand.

Ortega soils are nearly level to gently sloping and moderately well drained. They occur on narrow to broad ridges. Typically, the surface layer is grayish brown fine sand about 5 inches thick. Below this to a depth of 48 inches is very pale brown fine sand. A layer of white fine sand extends to a depth of 82 inches or more.

The minor soils in this map unit are the Lynn Haven, Pottsburg, Ridgeland, and Maurepas soils.

These soils have medium potential for pine trees because of wetness.

Potential is medium for improved pasture because of wetness. Water control measures are needed to remove excess water during rainy periods. The Ortega soils are limited by somewhat droughty conditions.

The Leon soils have medium potential for community development. Excessive wetness is the limitation. A properly designed water control system reduces the inherent high water table to usable limits. The Ortega soils have high potential for community development. Supplemental irrigation systems can be used to alleviate seasonal droughty conditions.

5. Leon-Ridgeland-Wesconnett

Nearly level, poorly drained and very poorly drained soils that are sandy throughout

This map unit is made up of broad areas of flatwoods interspersed with shallow depressions and large drainageways. It occurs in very large to medium-sized areas throughout the county. The natural vegetation of the flatwoods is slash pine, longleaf pine, sawpalmetto, gallberry, waxmyrtle, and fetterbush. Native grasses include lopsided indiangrass, pineland threeawn, panicum, and bluestems. The depressions and drainageways generally remain in native vegetation consisting of cypress, bay, magnolia, sweetgum, blackgum, cabbage palm, and pond pine.

This map unit makes up about 169,075 acres, or about 34 percent of the county. It is about 30 percent Leon soils, about 14 percent Ridgeland soils, about 12 percent Wesconnett soils, and about 44 percent soils of minor extent. Some of the Leon soils occur in a complex with Urban land.

Leon soils are nearly level and poorly drained. They are in flatwood areas. Typically, they have a surface layer of fine sand that is very dark gray in the upper 5 inches and dark gray in the lower 3 inches. The subsurface layer is gray fine sand. A layer of dark colored, weakly cemented fine sand occurs at a depth of about 18 inches, and a layer of dark brown fine sand occurs between depths of 37 and 45 inches. Below this, to a depth of 80 inches or more, is another layer of dark colored, weakly cemented fine sand.

Ridgeland soils are nearly level and poorly drained. Typically, they have a surface layer of very dark gray fine sand about 6 inches thick and a layer of dark colored, weakly cemented fine sand between depths of 6 and 16 inches. Below this to a depth of about 31 inches is very pale brown fine sand. Between depths of 31 and 80 inches or more is another layer of dark colored, weakly cemented fine sand.

Wesconnett soils are nearly level and very poorly drained. They occur in the shallow depressions and drainageways. Typically, the surface layer is black fine sand about 2 inches thick. Below that a layer of dark colored, weakly cemented fine sand extends to a depth of about 32 inches. Underlying this is a layer of pale brown fine sand about 12 inches thick and a layer of dark colored, weakly cemented fine sand that extends to a depth of 80 inches or more.

The minor soils in this unit are Lynn Haven, Olustee, Mascotte, Mandarin, Ortega, and Pottsburg soils, and Arents.

The soils in this map unit have overall medium potential for use as pine woodland because of wetness. The Wesconnett soils have low potential because of wetness and flooding.

Potential is medium for improved pasture because of wetness.

The Leon soils have medium potential for community development. Excessive wetness is the limitation. A properly designed water control system reduces the inherent high water table to usable limits. The Wesconnett soils have low potential for community development because of excessive wetness and flooding. Because of the low position of the soils along natural drainage patterns, and even with a water control system, flooding occurs for short periods.

6. Pelham-Mascotte-Sapelo

Nearly level, poorly drained soils that are sandy to a depth of 20 inches or more and loamy below

This map unit is made up of nearly level, broad flatwood areas. The largest areas are in the west-central part of the county. Most areas of this unit are in second growth slash pine and longleaf pine with an understory of fetterbush, fern, gallberry, sawpalmetto, and waxmyrtle. Grasses include lopsided indiangrass, pineland threeawn, panicum, and bluestems.

This unit makes up about 179,020 acres, or more than 36 percent of the land area in the county. It is about 25 percent Pelham soils, 15 percent Mascotte soils, and 12 percent Sapelo soils. Some of the Pelham soils and Mascotte soils occur in a complex with Urban land. Minor soils comprise the remaining 48 percent of this unit.

Pelham soils are nearly level and poorly drained. Typically, they have a surface layer of very dark gray loamy fine sand and a subsurface layer of light gray fine sand. The subsoil is light brownish gray fine sandy loam and sandy clay loam that begins at a depth of about 21 inches and extends to a depth of 69 inches or more.

Mascotte soils are nearly level and poorly drained. Typically, they have a surface layer of black fine sand and a subsurface layer of gray and light brownish gray fine sand. A layer of black, weakly cemented loamy fine sand occurs at a depth of about 15 inches. A layer of sandy clay loam occurs at a depth of about 28 inches and extends to a depth of about 58 inches. Below this is gray fine sand that extends to a depth of 80 inches or more.

Sapelo soils are nearly level and poorly drained. Typically, they have a surface layer of fine sand that is black in the upper 3 inches and dark gray in the lower 3 inches. The subsurface layer is light brownish gray fine sand. A dark colored, weakly cemented, sandy layer occurs at a depth of about 23 inches. At a depth of about 56 inches, this soil has a gray, loamy subsoil which extends to a depth of 80 inches or more.

Minor soils in this unit are Surrency, Yonges, Olustee, Wesconnett, and Yulee soils.

These soils have high potential for pine woodland.

Potential is high for improved pastures; however, wetness is a limitation.

These soils have medium potential for community development. Because wetness limits the soils for this use, a proper water control system is needed.

Soils of the hardwood and cypress swamps

These soils are in the eastern part of the county, mostly along tributaries of the St. Johns River.

7. Wesconnett-Maurepas-Stockade

Level and nearly level, very poorly drained soils; some are sandy throughout, some are loamy within a depth of 20 inches, and others are organic

This map unit is made up of freshwater hardwood and cypress swamps. It occurs mostly along tributaries of the St. Johns River in the eastern part of the county. Vegetation consists of blackgum, sweetgum, baldcypress, waxmyrtle, fern, sweetbay, and sawgrass. Some areas have pure stands of cypress.

This unit makes up about 24,865 acres, or about 5 percent of the county. It is about 30 percent Wesconnett soils, 25 percent Maurepas soils, 20 percent Stockade soils, and 25 percent soils of minor extent.

Wesconnett soils are nearly level and very poorly drained. Typically, they have a surface layer of black fine sand and a black to dark brown, weakly cemented layer within 10 inches of the surface. Below this is pale brown fine sand over another weakly cemented layer that extends to a depth of 80 inches or more.

Maurepas soils are nearly level and very poorly drained. Typically, they are dark reddish brown muck to a depth of 55 inches and black muck to a depth of 80 inches.

Stockade soils are nearly level and very poorly drained. Typically, they have a thick surface layer of black fine sandy loam and a subsoil of sandy clay loam within a depth of 20 inches. Below this, at a depth of about 46 inches, is a layer of dark grayish brown and light brownish gray fine sand that extends to a depth of more than 65 inches.

Minor soils in the unit are Surrency, Leon, Pamlico, and Pelham soils.

This unit is still in natural vegetation.

These soils have high potential for pine woodland; however, excessive wetness and flooding are limitations. Hardwood trees grow well on the Wesconnett and Stockade soils, and baldcypress grows well on the Maurepas soils.

Potential is medium for improved pastures because of excessive wetness and flooding.

These soils have low potential for community development. Excessive wetness and flooding affect the use of these soils. Because the soils are along natural drainage patterns, they are subject to flooding, even with a water control system, for short periods. The Maurepas soils have very low potential for community development because of low soil strength, excessive wetness, and flooding.

Soils of the tidal marsh

These soils are in broad expanses of tidal marsh, mainly in the northeastern part of the county along the St. Johns River, the Nassau River, and the Intercoastal Waterway.

8. Tisonia

Level and nearly level, very poorly drained, saline, organic soils underlain by clayey materials

This map unit consists of the tidal marsh in the county. The tidal marsh is saline in most places but is brackish where small feeder streams enter it. The unit is in the northwestern portion of the county along the St. Johns River, the Nassau River, and the Intercoastal Waterway. Natural vegetation is needlegrass rush and sand cordgrass. This unit is flooded daily by tides.

This unit makes up about 39,780 acres, or slightly more than 8 percent of the land area in the county. It is about 87 percent Tisonia soils and 13 percent soils of minor extent.

Tisonia soils are level or nearly level and very poorly drained. Typically, they are dark grayish brown mucky peat to a depth of 18 inches and dark olive gray clay to a depth of more than 65 inches. Tisonia soils have a high content of sulfur.

Minor soils in this unit are Pamlico and Maurepas soils, and Leon, Lynn Haven, Mascotte, and Ridgeland soils occur on the small islands in the unit.

Except for a few small areas, this unit is still in natural vegetation. It is a nursing ground for many species of commercially important finfish and shellfish.

These soils have very low potential for pine woodland because of excessive wetness, flooding, and the excess salts that prevent growth.

Potential is very low for improved pasture because of the unstable surface (low strength), excessive wetness, flooding, and the saline condition of the soil.

Potential for community development is very low because of excessive wetness, flooding, high shrink-swell potential, low soil strength, and high corrosivity.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The potential of a soil is the ability of that soil to produce, yield, or support the given structure or activity at a cost expressed in economic, social, or environmental units of value. The criteria used for rating soil potential include the relative difficulty or cost of overcoming soil limitations, the continuing limitations after practices in general use in overcoming the limitations are installed, and the suitability of the soil relative to other soils in Duval County.

A five-class system of soil potential is used. The classes are defined as follows:

Very high potential. Soil limitations are minor or are relatively easy to overcome. Performance for the intended use is excellent. Soils with very high potential are the best in the county for the particular use.

High potential. Some soil limitations exist, but practices necessary to overcome the limitations can be installed at reasonable cost. Performance for the intended use is good.

Medium potential. Soil limitations exist and can be overcome with recommended practices; limitations, however, are mostly of a continuing nature and require practices that have to be maintained or that are more difficult or costly than average. Performance for the intended use ranges from fair to good.

Low potential. Serious soil limitations exist, and they are difficult to overcome. Practices necessary to overcome the limitations are relatively costly compared to those required for soils of higher potential. Necessary practices can involve environmental values and considerations. Performance for the intended use is poor or unreliable.

Very low potential. Very serious soil limitations exist, and they are most difficult to overcome. Initial cost of practices and maintenance cost are very high compared to those for soils with high potential. Environmental values are usually depreciated. Performance for the intended use is inadequate or below acceptable standards.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have profiles that are almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. Pottsburg and Ortega, for example, are the names of two soil series. All the soils in the United States having the same series name have essentially the same characteristics.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics

that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Kureb fine sand, 2 to 8 percent slopes, is one of several phases within the Kureb series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Leon-Urban land complex is an example.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Beaches is an example.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

1—Albany fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping, somewhat poorly drained soil on narrow to broad ridges and isolated knolls. Individual areas range in size from 3 to 200 acres. Slopes are smooth and convex.

Typically, the surface layer is very dark gray fine sand about 3 inches thick. The subsurface layer is fine sand about 47 inches thick. The upper 26 inches is light yellowish brown, and the lower 21 inches is light gray and is finely mottled. The upper 13 inches of the subsoil is strong brown sandy loam that is coarsely mottled with light gray and red. The lower part is light gray sandy clay loam that is coarsely mottled with reddish yellow. It extends below a depth of 80 inches.

Included with this soil in mapping are small areas of Blanton, Mascotte, Pelham, and Sapelo soils. Also included are small areas of similar soils that have loamy layers at a depth of 20 to 40 inches. Included areas make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of 10 to 30 inches for 1 to 3 months, and at a depth of 30 to 60 inches for 4 to 8 months or more during most years. Permeability is rapid above a depth of 50 inches and moderate below. Natural fertility is low, and organic matter content is low. Available water capacity is low.

Natural vegetation consists of scrub oak, second growth slash pine and longleaf pine, and scattered sawpalmetto. Native grasses include pineland threeawn and various bluestems.

This soil is well suited to improved pasture.

With high-level management, this soil has moderately high potential for longleaf pine and slash pine.

This soil has high potential for dwellings without basements and local roads and streets. Wetness limits this soil for these uses. Maximum potential can be achieved through use of a water control system that lowers the inherent water table.

The potential of this soil for septic tank absorption fields is high. Its use is limited by wetness. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be achieved by applying practices which control soil blowing and alleviate the droughty conditions which exist during parts of the year. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system.

This soil has medium potential for lawn grasses and ornamental plants. Good management that includes supplemental irrigation during dry periods, proper fertilization, and regular care is needed to realize the potential. Capability subclass IIIw.

2—Alpin fine sand, 0 to 8 percent slopes. This is a nearly level to sloping, excessively drained soil on broad upland ridges. Individual areas range in size from 20 to 200 acres. Slopes are smooth to convex.

Typically, the surface layer is grayish brown fine sand about 5 inches thick. The subsurface layer is light yellowish brown fine sand to a depth of 11 inches and very pale brown fine sand to a depth of 48 inches. The next layer is very pale brown and white fine sand that contains bands of strong brown loamy fine sand and that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Blanton, Kershaw, Kureb, Ortega, and Pottsburg soils. Included areas make up less than 10 percent of any mapped area.

This soil has a water table at a depth of more than 72 inches. Permeability is very rapid throughout. Natural fertility and organic matter content are low. Available water capacity is low.

Natural vegetation consists of turkey oak, live oak, blackjack oak, and scattered slash pine and longleaf pine with an understory of runner oak, dwarf huckleberry, sawpalmetto, and greenbrier. Native grasses are pineland threeawn, various bluestems, and panicum.

This soil is moderately suited to improved pasture. Droughty conditions somewhat restrict root development.

With high-level management, this soil has moderately high potential for slash pine and longleaf pine.

This soil has very high potential for dwellings without basements and local roads and streets. There are no limitations for these uses.

The potential of this soil for septic tank absorption fields is very high; however, due to very rapid permeability and sandy textures, a concentration of absorption fields near water supplies could be a pollution hazard.

For playgrounds, this soil has a medium potential. It is limited by the sandy texture. Maximum potential can be achieved by applying practices which control soil blowing and alleviate the droughty conditions. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system. Playgrounds on soils having slopes of more than 6 percent may require land forming to overcome the slope limitation.

For lawn grasses and ornamental plants, this soil has medium potential. Droughty conditions restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass IVs.

3—**Aquic Quartzipsamments.** These are nearly level to gently sloping, sandy soils that have been reworked by manmade dredging and earthmoving operations, or they have formed by natural deposition on islands along the Atlantic Coast. Individual areas range in size from 5 to 200 acres. Slopes range from 0 to 5 percent and are smooth to convex.

Some areas of these soils were originally ridges that have been excavated to a depth below natural ground level and then reworked. Others are deep areas of dredge spoil. Other areas are natural depositions which occur as swales between the high dunes; soils in these areas have no diagnostic horizons. The material has been deposited in the last 150 years.

Where the soil has been reworked or mixed, it does not have an orderly sequence of horizons. The texture of the mixed material is fine sand. Colors are variable and range from white to brownish yellow. The most common colors are white, light gray, gray, pale brown, very pale brown, light yellowish brown, yellowish brown, and brownish yellow. Thickness of the mixed material ranges from 2 to 12 feet.

The soils that have been deposited naturally are fine sand to a depth of 80 inches or more. They are commonly light brownish gray, light gray, pale brown, very pale brown, and light yellowish brown. Few to many horizontal bands of black heavy minerals, mostly rutile and ilmenite, occur throughout the pedon.

Included with these soils in mapping are a few areas in which shell fragments or rock fragments occur in the sandy materials. Included areas make up about 20 percent of any mapped area.

Under natural conditions, these soils have a water table at a depth of less than 40 inches during most years. Permeability is very rapid throughout. Natural fertility is low. Organic matter content and available water capacity are low.

These soils are poorly suited to improved pasture. Droughty conditions during part of the year restrict root development. Even with high-level management, these soils have low potential for slash pine and longleaf pine. Droughty conditions restrict root development.

These soils have high potential for dwellings without basements and local roads and streets. Wetness limits these soils for these uses. Maximum potential can be achieved through use of a water control system that lowers the inherent water table.

The potential of these soils for septic tank absorption fields is high. The soils are moderately limited by wetness. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, these soils have medium potential. They are limited by sandy textures. Maximum potential can be achieved by applying practices which will control soil blowing and alleviate the droughty conditions which exist during parts of the year. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system.

For lawn grasses and ornamental plants, these soils have low potential. Droughty conditions during parts of the year restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Not assigned to a capability subclass.

4—**Arents.** These are nearly level, poorly drained soils that have been reworked by manmade earthmoving operations. Individual areas range in size from 5 to 500 acres. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the soils consist of mixed soil material. This material is light gray, grayish brown, very pale brown, yellow, black, dark reddish brown, strong brown, and red fine sand, sandy loam, and sandy clay loam. Sandy textures are dominant in most areas. The sandy loam and sandy clay loam part is fragments or pieces of subsoil material. Pieces of weakly cemented subsoil material are also present in most of these soils. Thickness of the material ranges from 2 to 20 feet. This soil does not have an orderly sequence of horizons.

Many areas of these soils are former shallow ponds or low flatwoods that have been filled with available soil material to surrounding ground level or to elevations above natural ground level. Soil materials are moved long distances by truck in some areas; in others the soil material is available at the site and transportation of the soil material is minimal.

Included with these soils in mapping are a few areas in which shell fragments or rock fragments occur in the sandy materials. Included areas make up about 15 percent of any mapped area.

Under natural conditions, these soils have a water table at a depth of 10 to 30 inches for 2 to 6 months during most years. Permeability is variable. Natural fertility is low, and organic matter content is variable. Available water capacity is variable.

These soils are moderately suited to improved pastures. Water control measures are needed to remove excess

water during wet periods. Low fertility is also a limiting factor.

These soils have medium potential for dwellings without basements and local roads and streets. Wetness and uneven settling limit these soils for these uses. Maximum potential can be achieved through use of a water control system that lowers the inherent water table. Compaction of the soil material may be necessary to provide sufficient strength.

The potential of these soils for septic tank absorption fields is high. This use is limited by excessive wetness. A properly designed water control system can be used to lower the water table to acceptable limits for septic tank use.

For playgrounds, these soils have medium potential. They are limited by excessive wetness. Maximum potential can be achieved by a water control system designed to remove excess water during rainy periods.

For lawn grasses and ornamental plants, these soils have medium potential. Good management that includes a water control system designed to remove excess water during rainy periods, proper fertilization, and regular care is needed to realize the potential. Not assigned to a capability subclass.

5—**Arents, sanitary landfill.** These are nearly level to gently sloping soils that have been reworked by manmade earthmoving operations. Individual areas range from 20 to 200 acres in size. Slopes range from 0 to 5 percent and are smooth to convex.

Typically, the upper 2 to 3 feet of these soils is a mixture of sandy materials interbedded with fragments or pieces of loamy subsoil material or weakly cemented, sandy subsoil material, or both. This material overlies large cells of garbage and refuse which range in thickness from 2 to 20 feet. In some areas, the mixture of sandy materials is used as a daily cover, and the garbage is in stratified layers within the sandy material.

Some areas of this map unit are in former pits, and others were constructed on the surface of undisturbed soils.

These soils have a variable water table that is dependent upon the water table of the nearby soils. Permeability is variable but generally ranges from very rapid to moderately rapid. Natural fertility is low. Organic matter content and available water capacity are variable.

For esthetic purposes, with high-level management, grasses or pine trees can be established. Commercial production, however, may not be practical.

These soils have very low potential for dwellings without basements and local roads and streets. Uneven settling and wetness in the lower areas limits these soils for these uses. If dwellings are constructed, they should be built on pilings with special foundations to support the intended load; however, driveways can collapse, and yards can develop holes or an uneven surface because of uneven settling. In wet areas, adequate water control is difficult.

Septic tank absorption fields are not practical because of the underlying cells of unstable garbage and refuse.

These soils have low potential for playgrounds. Undifferential settling would make maintenance cost high, and collapse of cells could be hazardous to people.

These soils could revegetate naturally for use as nature study areas. Not assigned to a capability subclass.

6—**Beaches.** Beaches consist of narrow strips of nearly level fine sand along the Atlantic Ocean. These areas are inundated with salt water daily at high tide. This material is a mixture of quartz sand; heavy minerals, principally rutile and ilmenite; and fragments of seashells. It is subject to movement by wind and tide and is bare of vegetation.

Beaches are used intensively for sunbathing and water-related recreational activities. Due to their unique location, their value for recreational activities, and the daily tidal flooding, other uses are not practical. Not assigned to a capability subclass.

7—**Blanton fine sand, 0 to 5 percent slopes.** This is a nearly level to gently sloping, moderately well drained soil on narrow to broad ridges and isolated knolls. Individual areas range from 10 to 500 acres in size. Slopes are smooth to convex.

Typically, the surface layer is dark gray fine sand about 3 inches thick. The subsurface layer is fine sand about 51 inches thick. The upper 33 inches is pale brown and very pale brown, and the lower 18 inches is white. The upper 11 inches of the subsoil is yellowish brown fine sandy loam that has very pale brown, yellowish red, and strong brown mottles. The lower part of the subsoil, to a depth of 83 inches or more, is strong brown fine sandy loam that has many dark yellowish brown and light gray mottles and a few yellowish red mottles.

Included with this soil in mapping are small areas of Albany, Alpin, Mascotte, Pelham, Ortega, and Sapelo soils. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a perched water table at a depth of 40 to 60 inches for 2 to 5 months during most years. Permeability is rapid above a depth of 54 inches and moderate below. Natural fertility is low, and organic matter content is low. Available water capacity is low.

Natural vegetation consists of turkey oak, blackjack oak, scrub oak, second growth slash pine and longleaf pine, and scattered sawpalmetto. Native grasses include grassleaf goldaster, pineland threeawn, and various bluestems.

This soil is moderately well suited to improved pasture. Droughty conditions somewhat restrict root development.

With high-level management, this soil has moderately high potential for longleaf pine and slash pine.

This soil has very high potential for dwellings without basements and local roads and streets. There are no limitations for these uses.

The potential of this soil for septic tank absorption fields is high.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be

achieved by applying practices which control soil blowing and alleviate the droughty conditions. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system.

For lawn grasses and ornamental plants, this soil has high potential. The soil is sandy and during dry periods may need supplemental irrigation. Good management that includes proper fertilization and regular care is needed to realize the potential. Capability subclass IIIs.

8—Canaveral fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping, moderately well drained to somewhat poorly drained soil on a broad ridge near the Atlantic Coast. The area is about 160 acres in size. Slopes are smooth to convex.

Typically, the surface layer is dark grayish brown fine sand about 6 inches thick. Below this is yellowish brown fine sand to a depth of about 17 inches. To a depth of 34 inches is light yellowish brown fine sand; shell fragments make up about 45 percent of this layer. Very pale brown shell fragments extend to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Fripp, Leon, Mandarin, Ortega, and Ridgeland soils. Also included are small areas of similar soils that have a thin, brown, weakly cemented layer at a depth of about 18 inches. Included areas make up about 25 percent of any mapped area.

Under natural conditions this soil has a water table at a depth of 10 to 40 inches for 2 to 6 months and at a depth of 40 to 60 inches for 4 to 8 months during most years. Permeability is very rapid throughout. Natural fertility is low, and organic matter content is low. Available water capacity is very low.

Natural vegetation consists of live oak, water oak, cabbage palm, bay, hickory, waxmyrtle, and scattered sawpalmetto.

This soil is poorly suited to improved pasture. Droughty conditions restrict root development.

With high-level management, this soil has moderate potential for slash pine. Droughty conditions during parts of the year restrict growth.

This soil has high potential for dwellings without basements and local roads and streets. Wetness during portions of the year limits this soil for these uses. Maximum potential can be achieved through use of a water control system that lowers the inherent high water table.

The potential of this soil for septic tank absorption fields is high. This use is limited by wetness. A properly designed water control system can be used to reduce the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be achieved by applying practices which control soil blowing and alleviate the droughty conditions that exist during parts of the year. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system.

For lawn grasses and ornamental plants, this soil has low potential. Droughty conditions restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass VIs.

9—Cornelia fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping, excessively drained soil on broad upland ridges and high bluffs along the Atlantic Coast. Individual areas range in size from 5 to 900 acres. Slopes are smooth to convex.

Typically, the surface layer is very dark gray fine sand about 7 inches thick. The subsurface layer is fine sand about 32 inches thick. The upper 6 inches is gray and the lower 26 inches is white. The subsoil extends to a depth of 106 inches. It is fine sand, and the sand grains are coated with organic matter. The upper 14 inches is dark reddish brown, the next 20 inches is dark yellowish brown, the next 19 inches is dark brown, and the lower 14 inches is reddish brown.

Included with this soil in mapping are small areas of Kureb, Leon, and Ortega soils. Included areas make up about 10 percent of any mapped area.

This soil has a water table at a depth of more than 72 inches. Permeability is moderate in the weakly cemented layers and rapid in all other layers. Natural fertility is very low, and organic matter content is medium to high. Available water capacity is low.

Natural vegetation consists of turkey oak, live oak, southern magnolia, waxmyrtle, sawpalmetto, red bay, and greenbrier. Native grasses include bluestems, pineland threeawn, and pinewoods dropseed.

This soil is poorly suited to improved pasture. Droughty conditions severely restrict root growth.

Even with high-level management, this soil has low potential for longleaf pine and slash pine because of droughty conditions.

This soil has very high potential for dwellings without basements and local roads and streets. This soil has no limitations for these uses.

The potential of this soil for septic tank absorption fields is high. No measures are needed to realize this potential.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be achieved by applying practices which alleviate soil blowing and the droughty conditions. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system.

For lawn grasses and ornamental plants, this soil has high potential. The soil is sandy and during dry periods may need supplemental irrigation. Good management that includes proper fertilization and regular care is needed to realize the potential. Capability subclass VIs.

10—Fripp fine sand, 2 to 8 percent slopes. This is a gently sloping to sloping, excessively drained soil on narrow to broad ridges along the Atlantic Coast. Individual areas range from 20 to 450 acres in size. Slopes are smooth to convex.

Typically, the surface layer is grayish brown fine sand about 6 inches thick. Below this, to a depth of 80 inches or more, is very pale brown fine sand that contains horizontal bands of black heavy minerals.

Included with this soil in mapping are small areas of Aquic Quartzipsamments and Mandarin and Leon soils. Also included are areas of soils in which slope is as much as 20 percent. Included areas make up less than 15 percent of any mapped area.

This soil has a water table at a depth of more than 72 inches. Permeability is rapid throughout. Available water capacity and organic matter content are very low.

Natural vegetation consists of live oak, cabbage palm, longleaf pine, slash pine, cedar, waxmyrtle, beach grasses, and sea oats. Some areas of this soil are devoid of vegetation.

The nearness of this soil to the ocean and the droughty conditions, which restrict root development, make this soil impractical for improved pasture.

This soil has low potential for slash pine and longleaf pine because it is so near the ocean. Droughty conditions also restrict root growth.

This soil has medium potential for dwellings with basements and local roads and streets. Storm tides limit this soil for these uses. To achieve maximum potential, dwellings should be designed to fit the natural terrain. Dwellings and roads should be restricted to the back dune portion of the landscape to afford protection from flooding during unusual weather conditions.

The potential of this soil for septic tank absorption fields is very high. No measures are needed to realize this potential. Due to very rapid permeability and sandy textures, however, a concentration of absorption fields near water supplies could be a pollution hazard.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be achieved by applying practices which control soil blowing and alleviate the droughty conditions. These practices include the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system. Playgrounds on soils having slopes of more than 6 percent may require land forming to overcome the slope limitation.

For lawn grasses and ornamental plants, this soil has low potential. Droughty conditions restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass VIIs.

11—Kershaw fine sand, 2 to 8 percent slopes. This is a gently sloping to sloping, excessively drained soil on broad ridges and isolated knolls. Individual areas range in size from 10 to 1,500 acres. Slopes are smooth to convex.

Typically, the surface layer is very dark gray fine sand about 3 inches thick. The layer below that, to a depth of 51 inches, is light yellowish brown fine sand. The next layer is brownish yellow fine sand that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Alpin, Pottsburg, and Ortega soils. Also included are small areas of similar soils that have few to common streaks and splotches of light grayish brown within a depth of 40 to 60 inches. Included areas make up less than 15 percent of any mapped area.

This soil has a water table at a depth of more than 72 inches. Permeability is very rapid throughout. Natural fertility and organic matter content are very low. Available water capacity is very low.

Natural vegetation consists of live oak, turkey oak, blackjack oak, and second growth slash pine and longleaf pine. Native grasses include pineland threeawn, panicum, and grassleaf goldaster.

This soil is poorly suited to improved pasture. Droughty conditions severely restrict root development.

Even with high-level management, this soil has low potential for slash pine and longleaf pine because of the existing droughty conditions.

This soil has very high potential for dwellings without basements and local roads and streets. There are no limitations for these uses.

The potential of this soil for septic tank absorption fields is very high; however, because of very rapid permeability and sandy texture, a concentration of absorption fields near water supplies could be a pollution hazard.

For playgrounds, this soil has medium potential. It is limited by the sandy texture. Maximum potential can be achieved by applying practices that control soil blowing and alleviate the droughty conditions. These practices include the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system. Playgrounds on soils having slopes of more than 6 percent may require land forming to overcome the slope limitation.

For lawn grasses and ornamental plants, this soil has low potential. Droughty conditions restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass VIIs.

12—Kershaw-Urban land complex. This complex is about 40 to 70 percent Kershaw fine sand, of which about 20 percent has been modified by cutting, grading, and shaping. About 25 to 50 percent is Urban land, or areas covered by houses, streets, driveways, buildings, parking lots, and other related construction. The open areas of Kershaw fine sand are in lawns, vacant lots, or playgrounds, and generally are so small and intermixed with Urban land that it is impractical to map them separately.

These soils have been reworked less in the older communities than in the newer, more densely populated ones. Excavating for streets to a depth below the original surface layer and spreading the soil material on adjacent areas is a common practice in the newer developments. The excavated material is also used to fill low areas.

Included in the mapped areas are small areas of Blanton and Ortega soils. These areas make up about 20 percent of the map unit.

These soils require good management practices to establish and maintain lawn grasses and ornamental plants because of the droughty nature of the soils and their inherent very low natural fertility. Not assigned to a capability subclass.

13—**Kershaw fine sand, smoothed.** This is a nearly level to gently rolling, excessively drained soil on narrow to broad ridges disturbed by recent mining operations. Individual areas range from 30 to 500 acres in size. Slopes range from 2 to 8 percent and are smooth to convex.

Typically, the surface layer is light gray fine sand about 22 inches thick. Below this is very pale brown fine sand that extends to a depth of 80 inches or more.

The content and particle size of the heavy minerals, mainly rutile and ilmenite, have been reduced by mining, and the remaining heavy minerals are well distributed throughout the soil.

Included with this soil in mapping are small areas of Leon and Ortega soils. Included areas make up about 15 percent of any mapped area.

This soil has a water table at a depth of more than 72 inches. Permeability is very rapid throughout. Natural fertility and organic matter content are very low. Available water capacity is very low.

This soil is devoid of vegetation except where reclamation has taken place. Normally it is seeded to deep-rooted grasses.

This soil is poorly suited to improved pasture. Droughty conditions severely restrict root development.

Even with high-level management, this soil has low potential for slash pine and longleaf pine because of the existing droughty conditions.

This soil has very high potential for dwellings without basements and local roads and streets. There are no limitations for these uses. Supplemental irrigation systems can be used to alleviate the droughty conditions.

The potential of this soil for septic tank absorption fields is very high; however, due to very rapid permeability and sandy textures, a concentration of absorption fields near water supplies could be a pollution hazard.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be achieved by applying practices that control soil blowing and alleviate the droughty conditions. These are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system. Playgrounds on soils having slopes of more than 6 percent may require land forming to overcome the slope limitation.

For lawn grasses and ornamental plants, this soil has low potential. Droughty conditions restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass VIIs.

14—**Kureb fine sand, 2 to 8 percent slopes.** This is a gently sloping to sloping, excessively drained soil on broad upland ridges and bluffs along the St. Johns River. Individual areas range in size from 3 to 600 acres. Slopes are convex.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The next layer is white fine sand that extends to a depth of 16 inches. Below this, to a depth of 60 inches, is yellow fine sand that contains tongues of white fine sand from the layer above. These tongues are surrounded by dark reddish brown, weakly cemented fine sand. Thin discontinuous layers of more dark reddish brown, weakly cemented fine sand occur at irregular intervals along the upper boundary of this layer. Below this, to a depth of 80 inches or more, is very pale brown fine sand that contains tongues similar to those in the layer above.

Included with this soil in mapping are small areas of Cornelia, Kershaw, Mandarin, and Ortega soils. Included areas make up less than 10 percent of any mapped area.

This soil has a water table at a depth of more than 72 inches. Permeability is rapid. Natural fertility and organic matter content are low. Available water capacity is very low.

Natural vegetation consists of scattered sand pine, scrub oak, sawpalmetto, fetterbush, rosemary, and dwarf huckleberry. Native grasses include various bluestems and panicum.

This soil is poorly suited to improved pasture. Droughty conditions severely restrict root growth.

Even with high-level management, this soil has low potential for longleaf pine and slash pine because of the droughty conditions.

This soil has very high potential for dwellings without basements and local roads and streets. There are no limitations for these uses.

The potential of this soil for septic tank absorption fields is very high; however, due to rapid permeability and sandy textures, a concentration of absorption fields near water supplies could be a pollution hazard.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be achieved by applying practices that control soil blowing and alleviate the droughty conditions. The practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system. Playgrounds on soils having slopes of more than 6 percent may require land forming to overcome the slope limitation.

For lawn grasses and ornamental plants, this soil has low potential. Droughty conditions restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass VIIs.

15—**Kureb fine sand, 8 to 20 percent slopes.** This is a strongly sloping to moderately steep, excessively drained soil on broad upland ridges and bluffs along the St. Johns River. Individual areas range in size from 15 to 200 acres. Slopes are convex.

Typically, the surface layer is very dark gray fine sand about 1 inch thick. The next layer is white fine sand that extends to a depth of 14 inches. Below this, to a depth of 64 inches, is yellow fine sand that contains tongues of white sand from the layer above. These tongues are surrounded by dark reddish brown, weakly cemented fine sand. Thin discontinuous layers of more dark reddish brown, weakly cemented fine sand occur at irregular intervals along the upper boundary of this layer. Below this, to a depth of 80 inches or more, is very pale brown fine sand that contains tongues similar to those in the layer above.

Included with this soil in mapping are small areas of Cornelia, Kershaw, and Ortega soils. Included soils make up less than 10 percent of any mapped area.

This soil has a water table at a depth of more than 72 inches. Permeability is rapid. Natural fertility and organic matter content are low. Available water capacity is very low.

Natural vegetation consists of scrub oak, sawpalmetto, rosemary, and dwarf huckleberry. Native grasses include various bluestems.

This soil is poorly suited to improved pasture. Droughty conditions severely restrict root growth.

Even with high-level management, this soil has low potential for longleaf pine and slash pine because of the droughty conditions.

This soil has high potential for dwellings without basements and local roads and streets. Slope limits this soil for these uses. Maximum potential can be achieved if buildings are designed to fit the natural terrain and if slope gradient for roads is reduced by cutting and filling.

The potential of this soil for septic tank absorption fields is high. This use is limited by slope, which affects layout and construction. Absorption fields should be installed on the contour. Due to rapid permeability and sandy textures, a concentration of absorption fields near water supplies could be a pollution hazard.

For playgrounds, this soil has medium potential. It is limited by slope and sandy textures. Maximum potential can be achieved by applying practices that control soil blowing and alleviate the droughty conditions. These are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system. Slope gradient can be reduced to an acceptable level by cutting and filling.

For lawn grasses and ornamental plants, this soil has very low potential. Slope and droughty conditions, which restrict root development, are limitations. Unless the slope gradient is reduced by cutting and filling, mowing can be difficult. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass VIIs.

16—Leon fine sand. This is a nearly level, poorly drained soil in broad flatwood areas. Individual areas range from 5 to 2,000 acres in size. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is fine sand about 8 inches thick. In the upper 5 inches it is very dark gray, and in the lower 3 inches it is dark gray. The subsurface layer is gray fine sand about 10 inches thick. The subsoil is fine sand that extends to a depth of more than 80 inches. The upper 8 inches of subsoil is black and weakly cemented, the next 11 inches is very dark gray and weakly cemented, the next 8 inches is dark brown, and the lower 35 inches is dark reddish brown and weakly cemented.

Included with this soil in mapping are small areas of Mascotte, Ortega, Pottsburg, Ridgeland, and Wesconnett soils. Also included are small areas of similar soils in which the subsoil is at a depth of more than 30 inches. Included soils make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years. Permeability is moderate to moderately rapid in the weakly cemented layers and rapid in all other layers. Natural fertility is low, and organic matter content is medium. Available water capacity is moderate.

Natural vegetation includes second growth slash pine and longleaf pine, sawpalmetto, inkberry, waxmyrtle, and fetterbush. Native grasses include lopsided indiangrass, pineland threeawn, panicum, and bluestems.

This soil is moderately suited to improved pasture if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has moderate potential for growing longleaf pine and slash pine.

This soil has medium potential for dwellings without basements and local roads and streets. Excessive wetness limits these soils for these uses. Maximum potential can be achieved through the use of a water control system that lowers the inherent high water table.

The potential of this soil for septic tank absorption fields is medium. This use is limited by excessive wetness. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by excessive wetness and sandy texture. Maximum potential can be achieved through the use of a water control system designed to remove excess water during rainy periods and through the use of practices that help control soil blowing during dry periods. Planting windbreaks, establishing vegetative cover, and keeping the surface moist help reduce or control soil blowing.

This soil has medium potential for lawn grasses and ornamental plants. For maximum potential, water control measures are needed to remove excess water during rainy periods. Capability subclass IVw.

17—Leon-Urban land complex. This complex is about 40 to 70 percent Leon fine sand, of which about 20 percent has been modified by cutting, grading, and shaping. About 25 to 45 percent is Urban land, or areas covered by houses, streets, driveways, buildings, parking lots, and other related construction (fig. 5). The open areas of Leon

fine sand are in lawns, vacant lots, or playgrounds, and generally are so small and intermixed with Urban land that it is impractical to map them separately. Slope ranges from 0 to 2 percent.

These soils have been reworked less in the older communities than in the newer, more densely populated ones. Excavating for streets to a depth below the original surface layer and spreading the soil material on adjacent areas is a common practice in the newer developments. The excavated material is also used to fill in low areas.

Included with this complex in mapping are small areas of Pottsburg and Ortega soils. These areas make up about 10 percent of the map unit.

If excess water is removed during rainy periods and good management practices are used, lawn grasses and ornamental plants can be established and maintained. Not assigned to a capability subclass.

18—**Lynn Haven fine sand.** This is a nearly level, poorly drained soil in broad flatwood areas. Individual areas range from 5 to 400 acres in size. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is fine sand about 13 inches thick. The upper 7 inches is black, and the lower 6 inches is very dark gray. The subsurface layer is light gray and gray fine sand extending to a depth of 21 inches. The subsoil is weakly cemented fine sand that extends to a depth of 80 inches or more. The upper 14 inches is black, the next 27 inches is dark reddish brown, and the lower 18 inches is dark brown.

Included with this soil in mapping are small areas of Leon, Pottsburg, Ridgeland, and Wesconnett soils. Included areas make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years. Permeability is moderate to moderately rapid in the weakly cemented layers and rapid in all other layers. Natural fertility is low, and organic matter content is high. Available water capacity is moderate.

Natural vegetation consists of second growth slash pine and longleaf pine, sawpalmetto, inkberry, waxmyrtle, and fetterbush. Native grasses include lopsided indiangrass, pineland threeawn, panicum, and bluestems.

This soil is well suited to improved pasture if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has moderately high potential for slash pine and longleaf pine.

This soil has medium potential for dwellings without basements and local roads and streets. Excessive wetness limits this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table.

The potential of this soil for septic tank absorption fields is medium. This use is limited by excessive wetness. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by excessive wetness and sandy texture. Maximum potential can be achieved through the use of a water control system designed to remove excess water during rainy periods and through the use of practices that help control soil blowing during dry periods. Planting windbreaks, establishing vegetative cover, and keeping the surface moist help reduce or control soil blowing.

This soil has medium potential for lawn grasses and ornamental plants. For maximum potential, water control measures are needed to remove excess water during rainy periods. Capability subclass IVw.

19—**Mandarin fine sand.** This is a nearly level, somewhat poorly drained soil on narrow to broad ridges slightly higher than the adjacent flatwoods. Individual areas range in size from 5 to 600 acres. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer is fine sand about 22 inches thick. The upper 4 inches is light brownish gray, and the lower 18 inches is light gray. The subsoil is fine sand that extends to a depth of 46 inches. Except for the lower 6 inches, it is weakly cemented and well coated with organic matter. The upper 4 inches is very dark grayish brown, the next 5 inches is very dark brown, the next 5 inches is black, and the lower 6 inches is brown. Below this, to a depth of 56 inches, is light gray fine sand. The next 6 inches is white fine sand, and the next 11 inches is grayish brown fine sand. Between depths of 73 and 80 inches is weakly cemented, black fine sand, and the sand grains are coated with organic matter.

Included with this soil in mapping are small areas of Leon, Mascotte, Ortega, and Pottsburg soils. Also included are small areas of similar soils in which the subsoil is at a depth of more than 30 inches. Included areas make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of 20 to 40 inches for 4 to 6 months during most years. The water table is at a depth of 10 to 20 inches for periods of as much as 2 weeks in some years. Permeability is moderate to moderately rapid in the weakly cemented layers and rapid in all other layers. Natural fertility is low, and organic matter content is low to medium. Available water capacity is low.

Natural vegetation consists of second growth slash pine and longleaf pine, scrub oak, greenbrier, and sawpalmetto. Native grasses include pineland threeawn, creeping bluestem, lopsided indiangrass, panicum, and paspalum.

This soil is poorly suited to improved pastures. Droughty conditions during parts of the year and low fertility restrict root growth.

With high-level management, this soil has moderate potential for longleaf pine and slash pine mainly because of droughty conditions.

This soil has high potential for dwellings without basements and local roads and streets. Wetness limits this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent water table.

The potential of this soil for septic tank absorption fields is medium. This use is limited by wetness. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by sandy textures. Maximum potential can be achieved by applying practices that help control soil blowing during dry periods. Planting windbreaks, establishing vegetative cover, and keeping the surface moist help reduce or control soil blowing.

This soil has medium potential for lawn grasses and ornamental plants. Droughty conditions during part of the year can restrict root development. Supplemental irrigation, proper fertilization, and regular care are needed to realize the potential. Capability subclass VIs.

20—**Mascotte fine sand.** This is a nearly level, poorly drained soil in broad flatwood areas. Individual areas range from 5 to 2,000 acres in size. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is black fine sand about 5 inches thick. The subsurface layer is fine sand about 10 inches thick. The upper 3 inches is gray, and the lower 7 inches is light brownish gray. The upper part of the subsoil, between depths of 15 and 25 inches, is loamy fine sand. It is weakly cemented, and the sand grains are coated with organic matter. The upper 6 inches is black, the next 2 inches is very dusky red, and the lower 2 inches is dark reddish brown. Below this is a layer of light gray and dark brown loamy fine sand about 3 inches thick. The lower part of the subsoil, between depths of 28 and 58 inches, is loamy. The upper 18 inches is coarsely mottled gray and yellowish red sandy clay loam, and the lower 12 inches is coarsely mottled light gray, strong brown, and red fine sandy loam. Below this, to a depth of 80 inches, is gray fine sand.

Included with this soil in mapping are small areas of Albany, Sapelo, Leon, and Pelham soils. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years. Permeability is rapid to a depth of 15 inches, moderate between depths of 15 and 58 inches, and rapid below. Natural fertility is moderate, and organic matter content is high. Available water capacity is moderate.

Natural vegetation consists of second growth slash pine and longleaf pine, sawpalmetto, inkberry, blackberry, waxmyrtle, and fetterbush. Native grasses include lopsided indiangrass, pineland threeawn, panicum, and bluestems.

This soil is well suited to improved pasture if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has moderately high potential for longleaf pine and slash pine.

This soil has medium potential for dwellings without basements and local roads and streets. Excessive wetness limits this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table.

The potential of this soil for septic tank absorption fields is medium. This use is limited by excessive wetness. A properly designed water control system can be used to lower the water table to acceptable limits for septic tank use.

For playgrounds, this soil has medium potential. It is limited by wetness and sandy textures. Maximum potential can be achieved by using a water control system designed to remove excess water during rainy periods and by applying practices that help control soil blowing during dry periods. Planting windbreaks, establishing vegetative cover, and keeping the surface moist help reduce or control soil blowing.

This soil has high potential for lawn grasses and ornamental plants. For maximum potential, water control measures are needed to remove excess water during rainy periods. Capability subclass IVw.

21—**Mascotte-Urban land complex.** This complex is about 45 to 75 percent Mascotte fine sand, of which about 20 percent has been modified by cutting, grading, and shaping. About 25 to 40 percent is Urban land, or areas covered by houses, streets, driveways, buildings, parking lots, and other related construction. The open areas of Mascotte fine sand are mostly lawns, vacant lots, or playgrounds, and generally they are so small and intermixed with Urban land that it is impractical to map them separately.

These soils have been reworked less in the older communities than in the newer, more densely populated ones. Excavating to a depth below the original surface layer and spreading the soil material on adjacent areas is a common practice in the newer developments. The excavated material is also used to fill in low areas.

Included with this complex in mapping are small areas of Albany, Leon, Pelham, and Sapelo soils. These areas make up about 15 percent of the map unit.

If excess water is removed during rainy periods and good management practices are used, lawn grasses and ornamental plants can be established and maintained. Not assigned to a capability subclass.

22—**Maurepas muck.** This is a level to nearly level, very poorly drained soil on the tributaries of major streams, in large drainageways, and in depressions. Individual areas range in size from 5 to 1,000 acres. Slopes are less than 1 percent and are smooth to concave.

Typically, the surface layer is dark reddish brown muck about 55 inches thick. Below is a layer of black muck that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Leon, Pamlico, Ridgeland, Surrency, Tisonia, and Wesconnett soils. Included areas make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches, or the soil is covered by water for 6 to 12 months during most years. Permeability

is moderately rapid throughout. Natural fertility is moderate, and organic matter content is very high. Available water capacity is high.

Natural vegetation consists of southern white cedar, blackgum, common baldcypress, sweetgum, bay, fern, sawgrass, briers, and water-tolerant grasses.

This soil is moderately well suited to improved pasture if water control measures are used to remove excess water. Due to the difficulty of installing these measures and the lack of outlets in many areas, this soil is seldom used for pasture. In addition, stumps, logs, and other woody fragments are exposed when the water table is lowered and the organic material subsides or oxidizes.

This soil is unsuitable for slash pine and longleaf pine. The high water table prevents the growth of pine trees.

This soil has very low potential for dwellings without basements and local roads and streets. Wetness, flooding, and low strength are the dominant features that restrict this soil for these uses. If the soil is used for these purposes, the organic material should be removed and replaced with suitable material, and water control measures should be installed to reduce wetness. Even with water control, some areas may still be subject to flooding. When the water table is lowered, the organic material oxidizes or slowly subsides.

The potential of this soil for septic tank absorption fields is very low. The major limitations are wetness and flooding. There are no practical methods to control the flooding and keep the water table deep enough for the absorption fields to function properly.

For playgrounds, the potential use of these soils is very low. The major limitations are wetness, flooding, and excess humus. If the soil is used for playgrounds, the organic material should be removed and replaced with suitable material and water control measures should be installed to reduce wetness. Even with water control, some areas may still be subject to flooding.

This soil has medium potential for lawn grasses and ornamental plants. Wetness and flooding are the major limitations, and in addition, woody fragments are exposed when the water table is lowered. Capability subclass VIIw.

23—**Olustee fine sand.** This is a nearly level, poorly drained soil in broad flatwood areas. Individual areas range in size from 5 to 2,000 acres. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is black fine sand about 6 inches thick. The upper part of the subsoil, between depths of 6 and 21 inches, is fine sand. It is weakly cemented, and the sand grains are well coated with organic matter. The upper 5 inches is very dark gray, and the lower 10 inches is black. Below this is a 15-inch layer of gray fine sand. The lower part of the subsoil, between depths of 36 and 54 inches, is gray sandy clay loam. Below this is a layer of dark gray fine sand about 10 inches thick. Below this, to a depth of 80 inches or more, is mixed light gray and gray fine sand.

Included with this soil in mapping are small areas of Leon, Pelham, Pottsburg, Ridgeland, and Sapelo soils. Included areas make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years. Permeability is rapid in the upper 6 inches and between depths of 21 and 36 inches, and it is moderate in the subsoil. Natural fertility is moderate, and organic matter content is high. Available water capacity is moderate.

Natural vegetation consists of oak, hickory, pine, saw-palmetto, and inkberry. Native grasses include pineland threeawn, panicum, and paspalum.

This soil is well suited to improved pasture if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has moderately high potential for longleaf pine and slash pine.

This soil has medium potential for dwellings without basements and local roads and streets. Wetness limits this soil for these uses. Maximum potential can be achieved through the use of a water control system that lowers the water table.

The potential of this soil for septic tank absorption fields is medium. Wetness limits this soil for this use. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by wetness and sandy texture. Maximum potential can be achieved by using a water control system designed to remove excess water during rainy periods and by applying practices that help control soil blowing during dry periods. Planting windbreaks, establishing vegetative cover, and keeping the surface moist help reduce or control soil blowing.

This soil has high potential for lawn grasses and ornamental plants. For maximum potential, water control measures are needed to remove excess water during rainy periods. Capability subclass IIIw.

24—**Ortega fine sand, 0 to 5 percent slopes.** This is a nearly level to gently sloping, moderately well drained soil on narrow to broad ridges and isolated knolls. Individual areas range from 2 to 2,000 acres in size. Slopes are smooth to convex.

Typically, the surface layer is grayish brown fine sand about 5 inches thick. Below this to a depth of 48 inches is very pale brown fine sand. The next layer is white fine sand that extends to a depth of 82 inches or more.

Included with this soil in mapping are small areas of Kershaw, Leon, Mandarin, and Pottsburg soils. Also included are small areas of similar soils that show evidence of wetness within a depth of 30 inches, similar soils that have a light gray subsurface layer, and similar soils that have a dark colored subsoil within a depth of 70 to 80 inches. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of 40 to 60 inches for more than 6 months during most years. Permeability is very rapid to a depth of 80 inches. Natural fertility and organic matter content are low. Available water capacity is low.

Natural vegetation consists of turkey oak, blackjack oak, second growth slash pine and longleaf pine, and scattered sawpalmetto. Native grasses include pineland threeawn, panicum, and grassleaf goldaster.

This soil is moderately well suited to improved pasture. Droughty conditions during part of the year somewhat restrict root development.

With high-level management, this soil has moderately high potential for longleaf pine and slash pine.

This soil has very high potential for dwellings without basements and local roads and streets. There are no limitations for these uses.

The potential of this soil for septic tank absorption fields is very high. This use can be limited somewhat by very rapid permeability, wetness, and sandy texture, since absorption fields near water supplies could be a pollution hazard. The water table is at a depth of about 4 feet for part of the year and fills the lower part of the absorption field.

For playgrounds, this soil has high potential. It is limited by sandy texture. Maximum potential can be achieved by applying practices which control soil blowing and alleviate the droughty conditions. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system.

For lawn grasses and ornamental plants, this soil has medium potential. Droughty conditions restrict root development. Supplemental irrigation, proper fertilization, and regular care are needed to realize the potential. Capability subclass IIIs.

25—**Pamlico muck.** This is a nearly level, very poorly drained soil on tributaries of major streams, in depressions, and in drainageways. Individual areas range in size from 20 to 1,000 acres. Slopes range from 0 to 2 percent and are smooth to concave.

Typically, the surface layer is black, well decomposed muck about 8 inches thick over 24 inches of very dusky red muck. A layer of dark brown muck extends to a depth of 37 inches. The next layers are very dark grayish brown fine sand about 25 inches thick and dark brown fine sand that extends to a depth of 80 inches or more.

Included with this soil in mapping are small areas of Leon, Lynn Haven, Maurepas, and Wesconnett soils. Also included are small areas of similar soils in which reaction is higher than extremely acid and small areas of soils that have loamy horizons below a depth of 40 inches. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches, and the soil is covered with water for more than 6 months during most years. Permeability is moderately rapid in the upper 38 inches and rapid below that depth. Natural fertility is moderate, and organic matter content is very high. Available water capacity is high.

Natural vegetation consists of sweetgum, bay, magnolia, pond pine, hickory, and waxmyrtle. Native grasses include sawgrass, needlerush, and spartina.

This soil is moderately well suited to improved pasture if water control measures are used to remove excess water. Due to the difficulty of installing these measures and the lack of outlets in many areas, it is seldom used for pasture.

This soil is unsuitable for slash pine and longleaf pine. The high water table prevents the growth of pine trees.

This soil has very low potential for dwellings without basements and local roads and streets. Wetness, flooding, and low strength are the dominant features that restrict this soil for these uses. If the soil is used for these purposes, the organic material should be removed and replaced with suitable material, and water control measures should be installed to reduce wetness. Even with water control, some areas may still be subject to flooding. When the water table is lowered, the organic material oxidizes or slowly subsides.

The potential use of this soil for septic tank absorption fields is very low. The major limitations are wetness and flooding. There are no practical methods to control the flooding and keep the water table deep enough for the absorption fields to function properly.

For playgrounds, the potential use of these soils is very low. The major limitations are wetness, flooding, and excess humus. If the soil is used for playgrounds, the organic material should be removed and replaced with suitable material, and water control measures should be installed to reduce wetness. Even with water control, some areas may still be subject to flooding.

This soil has medium potential for lawn grasses and ornamental plants. Wetness and flooding are the major limitations. Capability subclass VIIw.

26—**Pelham fine sand.** This is a nearly level, poorly drained soil in broad flatwood areas. Individual areas range in size from 2 to 2,000 acres. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is very dark gray loamy fine sand about 6 inches thick. The subsurface layer is fine sand about 15 inches thick. It is grayish brown in the upper 8 inches and light gray in the lower 7 inches. The subsoil is between depths of 21 and 69 inches. It is light brownish gray fine sandy loam in the upper 5 inches, light brownish gray sandy clay loam in the middle 34 inches, and light brownish gray fine sandy loam in the lower 9 inches.

Included with this soil in mapping are small areas of Albany, Mascotte, Olustee, Sapelo, and Yonges soils. Also included are similar soils in which the combined thickness of the surface layer and subsoil is less than 60 inches and soils in which the depth to the subsoil is less than 20 inches. Included areas make up about 15 percent of any mapped area.

Under natural conditions this soil has a water table at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 4 to 12 months during most years. Permeability is rapid to a depth of 21 inches and moderate below. Natural fertility is moderate, and organic matter content is high. Available water capacity is moderate.

Natural vegetation consists of second growth slash pine and longleaf pine, sweetgum, bay, grape, blackberry, waxmyrtle, and inkberry. Native grasses include lopsided indiangrass, panicum, and chalky bluestem.

This soil is well suited to improved pasture if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has high potential for longleaf pine and slash pine.

This soil has low potential for dwellings without basements and local roads and streets. Excessive wetness and flooding limit this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table.

The potential of this soil for septic tank absorption fields is low. This use is limited by excessive wetness and flooding. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has low potential. It is limited by excessive wetness. Maximum potential can be achieved by a water control system designed to remove excess water during rainy periods.

This soil has medium potential for lawn grasses and ornamental plants. Wetness and flooding are limitations. For maximum potential, water control measures are needed to remove excess water. Capability subclass IVw.

27—**Pelham-Urban land complex.** This complex is about 40 to 70 percent Pelham fine sand, of which about 20 percent has been modified by cutting, grading, and shaping. About 25 to 45 percent is Urban land, or areas covered by houses, streets, driveways, buildings, parking lots, and urban construction. The open areas of Pelham fine sand are mostly lawns, vacant lots, or playgrounds, and generally they are so small and intermixed with Urban land that it is impractical to map them separately. Slopes range from 0 to 2 percent.

These soils have been reworked less in the older communities than in the newer, more densely populated ones. Excavating for streets to a depth below the original surface and spreading the soil material on adjacent areas is a common practice in the newer developments. The excavated material is also used to fill in low areas.

Included in the mapped areas of this complex are small areas of Albany, Leon, Mascotte, and Sapelo soils. These areas make up about 15 percent of the map unit.

If excess water is removed during rainy periods and good management practices are used, lawn grasses and ornamental plants can be established and maintained.

Since the present and future use of these soils has already been determined, the potential of these soils for other uses is not discussed. Not assigned to a capability subclass.

28—**Pits.** Pits consist of excavations from which soil and geologic material have been removed for use in road construction or for foundation purposes. Pits, locally called borrow pits, range from small to large.

Many pits have been excavated to a depth below the normal water table and are ponded for 9 months or more each year. Most are abandoned, though excavation is continuing in a few places. Some of the older pits are used for fishing, and they are also used by wading birds and waterfowl as feeding areas. Most of these pits that contain water can be improved by stocking with fish. Not assigned to a capability subclass.

29—**Pottsburg fine sand.** This is a nearly level, somewhat poorly drained soil on the flatwoods at slightly higher elevations than the surrounding soils. Individual areas range from 5 to 800 acres in size. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is gray fine sand about 3 inches thick. The subsurface layer extends to a depth of 57 inches. It is brown fine sand 7 inches thick, grayish brown fine sand 24 inches thick, and light gray fine sand 23 inches thick. The subsoil, between depths of 57 and 80 inches, is dark reddish brown fine sand that is weakly cemented and well coated with organic matter.

Included with this soil in mapping are small areas of Kershaw, Leon, Mandarin, Ortega, Ridgeland, and Wesconnett soils. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of 6 to 12 inches for 2 to 4 months and at a depth of 12 to 40 inches for 6 to 9 months or longer during most years. Permeability is rapid to a depth of 57 inches and moderate below that depth. Natural fertility and organic matter content are low. Available water capacity is low.

Natural vegetation consists of second-growth slash pine and longleaf pine, sawpalmetto, blackjack oak, and inkberry. Native grasses include pineland threeawn, broomsedge bluestem, lopsided indiangrass, chalky bluestem, wild grape, and other perennial grasses.

This soil is well suited to improved pasture.

With high-level management, this soil has moderately high potential for longleaf pine and slash pine (fig. 6).

This soil has medium potential for dwellings without basements and local roads and streets. Wetness limits this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that removes excess water during rainy periods.

The potential of this soil for septic tank absorption fields is medium. This use is limited by wetness. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by sandy texture. Maximum potential can be achieved by applying practices which control soil blowing and alleviate the droughty conditions which exist during

parts of the year. These practices are the addition of topsoil, the planting of deep-rooted grasses, mulching, and the installation of a supplemental irrigation system.

For lawn grasses and ornamental plants, this soil has medium potential. Droughty conditions during part of the year can restrict root development. Good management that includes supplemental irrigation, proper fertilization, and regular care is needed to realize the potential. Capability subclass IVw.

30—**Ridgeland fine sand.** This is a nearly level, poorly drained soil in broad flatwood areas. Individual areas range in size from 5 to 800 acres. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The upper part of the subsoil, between depths of 6 and 16 inches, is fine sand. It is dark brown and weakly cemented, and the sand grains are well coated with organic matter. Below this is a layer of very pale brown fine sand about 15 inches thick. The lower part of the subsoil, between depths of 31 and 80 inches, is fine sand. It is weakly cemented, and the sand grains are coated with organic matter. The upper 8 inches is dark reddish brown, and the rest is black.

Included with this soil in mapping are small areas of Leon, Lynn Haven, Ortega, Pottsburg, and Wesconnett soils. Included areas make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches for brief periods of 2 to 4 weeks, at a depth of 10 to 20 inches for 2 to 4 months, and at a depth of 20 to 40 inches most of the remainder of the year during most years. A few small areas of this soil are covered with water for periods of 1 to 2 weeks. Permeability is rapid in the upper 6 inches and between depths of 16 and 31 inches and moderate to moderately rapid between depths of 6 and 16 inches and below a depth of 31 inches. Natural fertility is moderate, and organic matter content is high. Available water capacity is low.

Natural vegetation consists of second growth slash pine and longleaf pine, loblolly bay, sawpalmetto, and inkberry. Native grasses include pineland threeawn and lopsided indiangrass.

This soil is moderately well suited to improved pasture if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has moderately high potential for longleaf pine and slash pine.

This soil has medium potential for dwellings without basements and local roads and streets. Excessive wetness limits this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table.

The potential of this soil for septic tank absorption fields is medium. This use is limited by excessive wetness. A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by wetness and sandy textures. Maximum potential can be achieved by a water control system designed to remove excess water during rainy periods and by applying practices that help control soil blowing during dry periods. Planting windbreaks, establishing vegetative cover, and keeping the surface moist help reduce or control soil blowing.

This soil has high potential for lawn grasses and ornamental plants. For maximum potential, water control measures are needed to remove excess water during rainy periods. Capability subclass IIIw.

31—**Sapelo fine sand.** This is a nearly level, poorly drained soil in broad flatwood areas. Individual areas range in size from 2 to 2,000 acres. Slopes range from 0 to 2 percent and are smooth to convex.

Typically, the surface layer is black and dark gray fine sand about 6 inches thick. The subsurface layer extends to a depth of 23 inches. It is light brownish gray fine sand. The upper part of the subsoil, between depths of 23 and 38 inches, is fine sand. It is weakly cemented, and the sand grains are coated with organic matter. The upper 7 inches is black and dark reddish brown; the next 2 inches is black, dark reddish brown, and very dusky red; and the lower 6 inches is dark brown. Below this is a layer of very pale brown fine sand that extends to a depth of 56 inches. The lower part of the subsoil, to a depth of 80 inches or more, is gray. The upper 6 inches is sandy clay loam, and the lower 18 inches is fine sandy loam.

Included with this soil in mapping are small areas of Mascotte, Olustee, Pelham, and Yonges soils. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches for 2 to 4 months or more and at a depth of 10 to 30 inches for 2 to 6 months during most years. Permeability is very rapid to a depth of 23 inches, moderate to a depth of 38 inches, very rapid to a depth of 56 inches, and moderate below that depth. Natural fertility is moderate, and organic matter content is medium. Available water capacity is low.

Natural vegetation consists of second growth slash pine and longleaf pine, sawpalmetto, inkberry, blackberry, waxmyrtle, and fetterbush. Native grasses include lopsided indiangrass, pineland threeawn, panicum, and bluestems.

This soil is moderately well suited to improved pastures if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has moderately high potential for slash pine and longleaf pine.

This soil has medium potential for dwellings without basements and local roads and streets. Excessive wetness limits this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table.

The potential use of this soil for septic tank absorption fields is medium. This use is limited by excessive wetness.

A properly designed water control system can be used to lower the water table to acceptable limits.

For playgrounds, this soil has medium potential. It is limited by wetness and sandy textures. Maximum potential can be achieved by a water control system designed to remove excess water during rainy periods and by applying practices that help control soil blowing during dry periods. Planting windbreaks, establishing vegetative cover, and keeping the surface moist help reduce or control soil blowing.

This soil has medium potential for lawn grasses and ornamental plants. For maximum potential, water control measures are needed to remove excess water during rainy periods. Capability subclass IVw.

32—**Stockade fine sandy loam.** This is a nearly level, very poorly drained soil in shallow depressions and large drainageways. Individual areas range from 5 to 1,500 acres in size. Slopes range from 0 to 2 percent and are concave.

Typically, the surface layer is black fine sandy loam about 12 inches thick. The subsoil, between depths of 12 and 46 inches, is sandy clay loam. The upper 14 inches is very dark gray, and the lower 20 inches is dark gray. Below this is dark grayish brown and light brownish gray fine sand extending to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Leon, Ortega, Pottsburg, and Ridgeland soils. Also included are small areas of similar soils in which reaction in the subsoil is very strongly acid and strongly acid and a few areas of soils that have a loamy fine sand surface layer. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches, or the soil is covered with water for more than 6 months during most years. Permeability is moderately rapid in the surface layer, moderate to moderately rapid in the subsoil, and rapid below. Natural fertility and organic matter content are high. Available water capacity is moderate.

Natural vegetation consists of sweetgum, blackgum, water oak, swamp chestnut oak, scattered pine, and cypress with an understory of cinnamonfern, waxmyrtle, greenbrier, scattered maidencane, and other perennial forbs and shrubs.

This soil is well suited to improved pastures if water control measures can be established to remove excess water.

With high-level management, this soil has very high potential for longleaf pine and slash pine. Water control is necessary if the potential productivity is to be realized.

This soil has low potential for dwellings without basements and local roads and streets. Excessive wetness and flooding limit this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table. Due to the low position of this soil and its occurrence along the natural drainage patterns in the county, a flood hazard would still exist for short periods even if a water control system were in use.

The potential of this soil for septic tank absorption fields is low. This use is limited by excessive wetness and flooding. Maximum potential can be achieved with a water control system; however, a flood hazard would still exist because this soil occurs along natural drainage patterns.

For playgrounds, this soil has medium potential. It is limited by excessive wetness and flooding. Maximum potential can be achieved with a water control system designed to remove excess water during rainy periods.

This soil has medium potential for lawn grasses and ornamental plants. Wetness and flooding are limitations. For maximum potential, water control measures are needed to remove excess water. Capability subclass IVw.

33—**Surrency fine sand.** This is a nearly level, very poorly drained soil in shallow depressions and broad drainageways. Individual areas range in size from 5 to 900 acres. Slopes are less than 1 percent and are smooth to concave.

Typically, the surface layer is about 18 inches thick. The upper 14 inches is black loamy fine sand, and the lower 4 inches is dark brown fine sand. The subsurface layer is light brownish gray fine sand about 8 inches thick. The subsoil, between depths of 26 and 70 inches, is fine sandy loam. The upper 12 inches is dark grayish brown and has light gray and dark brown mottles, the next 11 inches is dark gray and has light brownish gray mottles, and the lower 21 inches is greenish gray. Below this, to a depth of 80 inches or more, is greenish gray sandy clay loam.

Included with this soil in mapping are small areas of Pottsburg, Leon, Mascotte, Olustee, Pelham, and Wesconnett soils. Also included are small areas of similar soils in which reaction ranges from medium acid to mildly alkaline and small areas of soils in which the surface layer is fine sand. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches or the soil is covered with water for 6 to 12 months during most years. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Natural fertility is moderate, and organic matter content is high. Available water capacity is moderate.

Natural vegetation consists of cypress, bay, waxmyrtle, sweetgum, water oak, and smilax.

This soil is seldom used for improved pastures due to the difficulty of installing water control measures to remove excess water.

With high-level management, this soil has high potential for slash pine and longleaf pine. Water control is necessary if the potential productivity is to be realized.

This soil has low potential for dwellings without basements and local roads and streets. Flooding and excessive wetness limit this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table. Due to the low position of this

soil and its occurrence along the natural drainage patterns in the county, a flood hazard would still exist for short periods even if a water control system were in use.

The potential of this soil for septic tank absorption fields is low. This use is limited by excessive wetness and flooding. Maximum potential can be achieved with a water control system; however, a flood hazard would still exist because this soil occurs along natural drainage patterns.

For playgrounds, this soil has low potential. It is limited by excessive wetness and flooding. Maximum potential can be achieved by a water control system designed to remove excess water during rainy periods.

This soil has medium potential for lawn grasses and ornamental plants. Wetness and flooding are limitations. For maximum potential, water control measures are needed to remove excess water. Capability subclass Vw.

34—**Tisonia mucky peat.** This is a level to nearly level, very poorly drained soil on broad tidal marshes. Individual areas range in size from 4 to 4,000 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer is dark grayish brown mucky peat about 18 inches thick. It is underlain by dark olive gray clay that extends to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Leon, Maurepas, Pamlico, and Ridgeland soils. Also included are small areas of similar soils that have a surface layer less than 16 inches in thickness. Included soils make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches, or the soil is covered by water for 6 to 12 months during most years. Tidal action inundates this soil twice daily. Permeability is rapid in the surface layer and very slow in the clayey material. Natural fertility is low, and organic matter content is very high. Available water capacity is high.

Natural vegetation is dominantly needlegrass rush, seashore saltgrass, marshhay cordgrass, and smooth cordgrass.

This soil is unsuited to improved pastures. Wetness, flooding, high salinity, and high sulfur content are unfavorable properties. If diked and drained, exposure of the soil to air would lower the soil reaction too much for the growth of pastures. Needed additions of lime would be too large to be practical.

This soil is unsuitable for slash pine and longleaf pine. Inundation by salt water retards tree growth.

This soil has very low potential for dwellings without basements, local roads and streets, septic tank absorption fields, playgrounds, and lawn grasses and ornamental plants. The major limitations are twice-daily flooding by tidal action and wetness. Dwellings could be specially designed and built above the water level on pilings; however, these areas are breeding and feeding grounds for a wide variety of marine life. Capability subclass VIIIw.

35—**Urban land.** Urban land consists of areas that are 85 percent or more covered with streets, houses, commercial buildings, parking lots, shopping centers, industrial parks, airports, and related facilities.

Small areas of undisturbed soils, such as Kershaw, Blanton, Kureb, Leon, Pottsburg, Mascotte, Pelham, and Ortega soils, are mostly in lawns, parks, vacant lots, and playgrounds. Other areas are made up of undifferentiated soil materials. These areas are in tracts too small to be mapped separately. Not assigned to a capability subclass.

36—**Wesconnett fine sand.** This is a nearly level, very poorly drained soil in shallow depressions and large drainageways. Individual areas range in size from 4 to 1,200 acres. Slopes range from 0 to 2 percent and are smooth to concave.

Typically, the surface layer is black fine sand about 2 inches thick. The upper part of the subsoil, between depths of 2 and 32 inches, is weakly cemented fine sand. The upper 8 inches is black, the next 16 inches is dark reddish brown, and the lower 6 inches is dark brown. Below this is a layer of pale brown fine sand about 12 inches thick. The lower part of the subsoil, between depths of 44 and 80 inches, is fine sand. It is weakly cemented, and the sand grains are well coated with organic matter. The upper 28 inches is reddish black, and the lower 8 inches is very dusky red.

Included with this soil in mapping are small areas of Leon, Lynn Haven, Maurepas, Pamlico, Pottsburg, and Ridgeland soils. Also included are small areas of similar soils that are slightly acid to moderately alkaline. Areas of this soil along Yellow Water and McGirt's Creeks have natural depositions of sandy materials 2 to 4 feet thick overlying the natural soil. Included areas make up about 20 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of 0 to 10 inches, or the soil is covered by water for 6 to 12 months during most years. Permeability is rapid in the surface layer and between depths of 32 and 44 inches and moderate to moderately rapid between depths of 2 and 32 inches and below a depth of 44 inches. Natural fertility is moderate, and organic matter content is high. Available water capacity is moderate.

Natural vegetation consists of baldcypress, sweetbay, magnolia, sweetgum, cabbage palm, holly, and water oak with an understory of waxmyrtle and sparse amounts of creeping bluestem, hairy bluestem, and toothachegrass.

This soil is moderately well suited to improved pastures if water control measures are used to remove excess water. Due to the difficulty of installing these measures and the lack of outlets in many areas, the soil is seldom used for pasture.

With high-level management, this soil has high potential for slash pine and longleaf pine. Water control is necessary if the potential productivity is to be realized.

This soil has low potential for dwellings without basements and local roads and streets. Flooding and excess wetness limit this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table. Due to the low position of this

soil and its occurrence along the natural drainage patterns in the county, a flood hazard would still exist for short periods even if a water control system were in use.

The potential of this soil for septic tank absorption fields is low. This use is limited by excessive wetness and flooding. Maximum potential can be achieved with a water control system; however, a flood hazard would still exist because this soil occurs along natural drainage patterns.

For playgrounds, this soil has very low potential. It is limited by excessive wetness and flooding. Maximum potential can be achieved with a water control system designed to remove excess water during rainy periods.

This soil has medium potential for lawn grasses and ornamental plants. Wetness and flooding are limitations. For maximum potential, water control measures are needed to remove excess water. Capability subclass VIw.

37—**Yonges fine sandy loam.** This is a nearly level, poorly drained soil on low-lying parts of the Coastal Plain. Individual areas range in size from 5 to 300 acres. Slopes range from 0 to 2 percent and are smooth to concave.

Typically, the surface layer is very dark gray fine sandy loam about 3 inches thick. The subsurface layer is gray loamy fine sand about 3 inches thick. The subsoil extends between depths of 6 and 80 inches. The upper layer of subsoil is gray and yellow, mottled sandy clay loam about 19 inches thick. The next layer is gray and dark gray sandy clay loam that contains coarse, brownish yellow mottles and that extends to a depth of 31 inches. The next 24 inches is mixed gray, yellowish brown, and yellow sandy clay loam. Below this is greenish gray sandy clay loam that contains coarse yellowish brown mottles and that is about 10 inches thick. The next layer extends to a depth of 80 inches; it is mixed dark greenish gray, greenish gray, and light olive brown sandy clay loam.

Included with this soil in mapping are small areas of Mascotte, Pelham, Sapelo, and Stockade soils. Also included are small areas of similar soils in which reaction ranges from medium acid to very strongly acid. Also included are a few areas of soils that have a loamy fine sand surface layer. Included areas make up about 10 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches for 2 to 6 months during most years. Permeability is moderate to moderately rapid in the surface layer, moderately slow in the subsoil, and moderate below. Natural fertility is moderate, and organic matter content is low. Available water capacity is high.

Natural vegetation consists of water oak, live oak, sweetgum, blackgum, waxmyrtle, scattered sawpalmetto, and inkberry. Native grasses include lopsided indiangrass, panicum, and maidencane.

This soil is well suited to improved pastures if water control measures are used to remove excess water during rainy periods.

With high-level management, this soil has very high potential for slash pine and longleaf pine. Some water control is necessary if the potential productivity is to be realized.

This soil has low potential for dwellings without basements and local roads and streets. Excessive wetness and flooding are the dominant features that limit this soil for these uses. Maximum potential can be achieved through the use of a water control system that lowers the inherent high water table, but the moderately slow permeability of this soil needs to be considered in design.

Potential of this soil for septic tank absorption fields is very low. This use is limited by excessive wetness, moderately slow permeability, and flooding. Even if adequate water control is available, the size of the septic tank absorption fields should be greatly increased because of the moderately slow permeability.

For playgrounds, this soil has low potential. It is limited by excessive wetness and flooding. Maximum potential can be achieved with a water control system designed to remove excess water during rainy periods.

This soil has high potential for lawn grasses and ornamental plants. Wetness and flooding are limitations. For maximum potential, water control measures are needed to remove excess water. Capability subclass IIIw.

38—**Yulee clay.** This is a nearly level, very poorly drained soil in shallow depressions and large drainageways. Individual areas range in size from 5 to 1,500 acres. Slopes range from 0 to 2 percent and are concave.

Typically, the surface layer is black clay about 14 inches thick. The subsoil, between depths of 14 and 66 inches, is sandy clay. The upper layer, 14 inches thick, is very dark gray and has strong brown mottles. The next two layers are dark gray and have yellowish brown mottles; they extend to a depth of 48 inches. The layer below this, about 18 inches thick, is dark gray and has coarse strong brown and dark red mottles. Below this is a layer of pale yellow sandy clay loam that has dark reddish brown and dark yellowish brown mottles and that is about 9 inches thick. Below this, and extending to a depth of 80 inches or more, is a layer of coarsely mottled greenish gray, dark greenish gray, and olive clay loam.

Included with this soil in mapping are small areas of Mascotte, Olustee, Pelham, Sapelo, and Yonges soils. Also included are small areas of similar soils that are very strongly acid and similar soils that have a clay loam surface layer. Included areas make up about 15 percent of any mapped area.

Under natural conditions, this soil has a water table at a depth of less than 10 inches, or the soil is covered with water for more than 6 months during most years. Permeability is moderately slow to a depth of 14 inches and moderate below. Natural fertiliity and organic matter content are high. Available water capacity is medium to high.

Natural vegetation consists of sweetgum, blackgum, water oak, scattered pond pine, and cypress with an understory of cinnamonfern, waxmyrtle, greenbrier, scattered maidencane, and other perennial forbs and shrubs.

This soil is moderately well suited to improved pasture if water control measures are used to remove excess water. Due to the difficulty of installing these measures and the lack of outlets in many areas, the soil is seldom used for pasture.

With high-level management, this soil has very high potential for slash pine and longleaf pine. Water control is necessary if the potential productivity is to be realized.

This soil has very low potential for dwellings without basements and local roads and streets. Excessive wetness and flooding are the primary limitations of this soil for these uses. Maximum potential can be achieved through the use of a water control system, designed for the intended use, that lowers the inherent high water table. Due to the low position of this soil and its occurrence along the natural drainage patterns in the county, a flood hazard would still exist for short periods even if a water control system were in use. The moderate shrink-swell potential of the surface layer is a limitation for building foundations. This limitation can be overcome by removing the surface layer or by strengthening the foundation. To overcome the low strength limitation of the soil for local roads and streets, the soil material needs to be removed and replaced with material of high strength.

The potential of this soil for septic tank absorption fields is low. This use is limited by excessive wetness and by flooding. Maximum potential can be achieved with a water control system; however, a flood hazard would still exist because this soil occurs along natural drainage patterns.

For playgrounds, this soil has very low potential. It is limited by excessive wetness, flooding, and clayey texture in the surface layer. Maximum potential can be achieved with a water control system designed to remove excess water during rainy periods.

This soil has medium potential for lawn grasses and ornamental plants. Wetness and flooding are limitations. For maximum potential, water control measures are needed to remove excess water. Capability subclass VIIw.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, woodland, and woodland grazing; as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities; and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of wetness or organic soils that cause difficulty because of their low strength.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

JOHN D. GRIFFIN, agronomist, Soil Conservation Service, helped prepare this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the predicted yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms, should also consider the detailed information given in the description of each soil.

Less than 30,000 acres in the survey area was used for crops and pasture in 1967, according to the Conservation Needs Inventory (*7*). Of this total, 26,000 acres was used

for permanent pasture and less than 4,000 acres was used for special crops.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. In 1975 there were about 120,000 acres of urban and suburban land in the survey area, and this figure has been increasing at the rate of about 500 acres per year. The use of this soil survey to help make land use decisions that will influence the future role of farming in the county is discussed in the section "General soil map for broad land use planning."

Soil erosion is not a major problem on the cropland and pastureland in Duval County.

Soil blowing can be a hazard on the sandy, better drained soils and on the more poorly drained, sandy soils after they have been drained. Soil blowing can damage these soils in a few hours if winds are strong and the soils are dry and bare of vegetation or surface mulch. Maintaining vegetative cover or surface mulch minimizes soil blowing on these soils. Windbreaks of adapted plants, such as pine, redcedar, and myrtle, are effective in reducing soil blowing.

Information for the design of erosion control practices for each kind of soil is available in local offices of the Soil Conservation Service.

Soil drainage is the major management need on most of the acreage used for special crops and pasture in the survey area. Some soils are wet and need drainage or water control for the production of special crops and pasture grasses. These include the poorly drained Leon, Lynn Haven, Mascotte, Olustee, Pelham, Ridgeland, Sapelo, and Yonges soils and the very poorly drained Stockade, Surrency, Wesconnett, and Yulee soils. These soils make up about 279,320 acres in the survey area. Also in this category are the organic soils—Maurepas and Pamlico soils—which make up about 13,855 acres. Alpin, Blanton, Kershaw, Kureb, and Ortega soils have good natural drainage, and they tend to dry out quickly after rains.

The design of both surface and subsurface drainage systems varies with the kind of soil. Surface drainage is needed in most areas of the poorly drained and very poorly drained soils used for special crops and pasture. Finding adequate outlets for drainage systems is difficult in many areas of Pamlico, Surrency, Wesconnett, Yonges, and Yulee soils.

Soil fertility is naturally low in most soils in the survey area. Most of the soils are naturally acid. Canaveral, Stockade, Yonges, and Yulee soils range from slightly acid to mildly alkaline and are higher in plant nutrients than most of the other soils.

On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Field crops, although suited to the soils and climate of the survey area, are not commonly grown.

Special crops grown commercially in the survey area are vegetables, small fruits, tree fruits, and nursery plants. A small acreage throughout the survey area is used for melons, blueberries, sweet corn, tomatoes, other vegetables, citrus, and small fruits.

The latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Pasture production in many parts of the survey area has been greatly depleted by continued excessive use. Productivity of the pasture can be increased by using management practices that are effective for the specific kinds of soil and pasture plants involved.

Most farm income is derived from livestock, principally dairy cattle. On many dairies, the forage produced on pastureland is supplemented by green chop, small grain, and millet.

In areas of similar climate and topography, differences in the kinds and amount of forage that pasture can produce are related closely to the kind of soil. Effective management is based on the relationships among soils, pasture plants, and water management.

Table 5 shows, for each kind of soil, the potential annual production of pasture in animal unit months. An animal unit month refers to the number of months during the normal growing season that will provide grazing for one animal without injury to the sod. One animal unit is defined as one cow, horse, or steer, or five hogs.

The major pasture plants are improved bermudagrass, bahiagrass, white clover, and ryegrass. Small grains are used during the winter to supplement the permanent pastures. Millet, sorghum, and Sudan hybrids are grown during the summer for green chop and grazing.

The latest information and suggestions for growing and managing pasture can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal varieties of grasses and legumes under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. They were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be using more advanced practices and obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various varieties of grasses and legumes depends on the kind of soil. Such management provides drainage and protection from flooding; the proper planting and seeding rates; suitable high-yielding varieties; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements; and harvesting crops with the smallest possible loss.

The estimated yields reflect the productive capacity of the soils for the grasses and legumes shown in the table. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

A few crops are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. Capability class and subclass are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 6. All land in the survey area except Pits, Urban land, and complexes made up of a soil and Urban land are included. Some of the soils that are moderately well suited to crops and pasture are in woodland or other low-intensity use, for example, soils in capability class III. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Woodland management and productivity

CARL D. DEFAZIO, forester, Soil Conservation Service, and FRANK S. HILL, District Forester, Division of Forestry, helped prepare this section.

Woodland covers approximately 321,000 acres, or 65 percent, of the total land area of the survey area. The soils and climate of Duval County are suitable for growing timber; most of the forest land is on acid flatwood soils, such as those of the Leon, Lynn Haven, Pelham, and Wesconnett series. The woodland resources are evenly distributed throughout the county, and most are owned by large wood-using industries.

Slash pine is the dominant species in Duval County. Other major species are longleaf pine and sand pine. Sand pine occurs extensively on the sandhills in the eastern portion of the county. The major soil in this area is Kershaw fine sand. Many hardwood species, such as turkey, laurel, live, and water oaks, grow in the flatwoods and sandhills. Sweetgum, blackgum, sweetbay, and baldcypress grow along the St. Johns River.

Timber management consists primarily of clearcutting and planting with intensive site preparation. Prescribed

burning is important in controlling living and dead understory vegetation and reducing the probability of wildfire. It also encourages the establishment of grasses and forbs which help support various wildlife species such as deer, turkey, and quail.

Markets are plentiful for the wood of Duval County. Two pulpmills are in Jacksonville, and two are in Fernandino Beach. There are a few saw mills in the area. They saw mainly baldcypress.

The first efforts at fire control in Duval County were begun in 1929 in a cooperative venture with the Florida Forest Service. This was a time of open range, and much land was burned for spring cattle grazing. In 1933, Duval County instituted countywide fire control by contract with the Board of County Commissioners. There was an interruption of service from 1939 to 1941. Service then continued until January of 1969, when the State Forest Service was reorganized and renamed the Division of Forestry, Department of Agriculture and Consumer Services. In 1972, forest fire control became mandatory for all counties in the State.

For more information relating to woodland resources, contact the Florida Division of Forestry, the Soil Conservation Service, or the County Extension Service.

Table 7 contains information useful to woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed, and the ordination symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r.

In table 7 the soils are also rated for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate*, that some trees are blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade or grow if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* (*5*, *8*, *15*). This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Windbreaks and environmental plantings

Windbreaks are established to protect livestock, buildings, and yards from wind. Windbreaks also help protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaved and coniferous species provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals

across the field, the interval depending on erodibility of the soil. They protect cropland and crops from wind and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. A healthy planting stock of suitable species planted properly on a well prepared site and maintained in good condition can insure a high degree of plant survival.

Additional information about planning windbreaks and screens and the planting and care of trees can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from nurserymen.

Coastal dune management

JOHN D. GRIFFIN, agronomist, Soil Conservation Service, helped prepare this section.

In geological time, the coastal dune is a very recent formation. The coastal dune is under the control of ocean waves and of winds. The resulting soil moisture, soil salinity, and salt spray create a harsh environment for most plants.

Dune stabilization is dependent upon the anchoring of vegetation. If the use of shallow wells lowers ground water below a critical level, the stabilizing plants will die. The vegetation is very fragile and vulnerable to trampling. Small jetties extending from the shore arrest the littoral drift and prevent the sand from supplementing the dunes.

The beach is tolerant to such uses as swimming, picnicking, shell collecting, fishing, and sunbathing, but the primary dune is absolutely intolerant of heavy use. It cannot stand any trampling. It should be crossed on bridges. The trough is much more tolerant, and incidental development can occur; however, lowering of the ground water can cause the vegetation to die.

The inland dune is the second line of defense and is as vulnerable as the primary dune. It is intolerant of and not suitable for development.

The backdune has a more permissive location. It provides the most suitable environment on the coastal dune for man and development.

The final zone is the estuarine and bayshore environments, which are among the most productive aquatic areas in the world. Infants of the important fish species live here, and so do the valuable shellfish.

Some of the more important plants on the coastal dune are sea-oats, marshhay cordgrass, beach morning glory, baybean, shoredune panicum, seagrape, and myrtle.

Engineering

ELWYN COOPER, civil engineer, and BISHOP C. BEVILLE, sanitary engineer, Soil Conservation Service, helped prepare this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational areas; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to

the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 8 shows, for each kind of soil, the degree and kind of limitations for building site development; table 9, for sanitary facilities; and table 11, for water management. Table 10 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 8. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 8 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Slope is also an important consideration in the choice of sites for these structures and was considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 8 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to very compact layers, and content of large stones affect stability and ease of excavation.

In addition to the limitations listed in table 8 for building site development, soil erosion can be a major problem when the existing vegetation is removed and erosion control measures have not been properly installed.

Erosion by water damages structures, fills streams and ponds with sediment, and damages fish habitat.

Erosion by wind can be a problem on sandy soils that are dry and bare of vegetation. Wind erosion pollutes the air and endangers automotive traffic.

Vegetative measures to control erosion are: leaving as much native vegetation during the clearing of land as possible, planting temporary cover, applying mulch, and establishing permanent vegetation as soon as possible.

The latest information and suggestions for controlling erosion can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local

officials. Table 9 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, and *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

Percolation tests are performed to determine the absorptive capacity of the soil and its suitability for septic tank absorption fields. These tests should be performed during the season when the water table is highest and the soil is at minimum absorptive capacity.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold municipal sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. Where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 9 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

If it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 10 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material

where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 14 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low frost action potential, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor.*

Sand is used in great quantities in many kinds of construction. The ratings in table 10 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in tables 15 and 18.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can restrict plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils or very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 11 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Organic matter in a soil downgrades the suitability of the soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 11 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 12 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 9, and interpretations for dwellings without basements and for local roads and streets, given in table 8.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, and are not subject to flooding during the period of use.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes.

Wildlife habitat

Wildlife is a minor resource in Duval County. Urbanization has eliminated habitat suitable for many game and nongame species, and only in undeveloped areas in the southeastern and western portions of the county are wildlife still numerous.

Wildlife in the survey area includes bobwhite quail, mourning dove, rabbits, gray squirrel, fox squirrel, turkey, white-tailed deer, wild hogs, raccoon, and numerous species of waterfowl.

All soils in the county are suited to and can support one or more species of wildlife. The district respresentative of the Soil Conservation Service can provide landowners with technical guides for establishing and maintaining wildlife habitats and for stocking and managing fishponds.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 13, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect

management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of habitat are very severe and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, oats, millet, cowpeas, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are lovegrass, Pensacola bahiagrass, Argentine bahiagrass, hairy indigo, lespedeza, and sesbania.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild harbaceous plants are bluestem, lopsided indiangrass, goldenrod, beggarweed, pokewee, and partridgepea.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of hardwood plants are oak, magnolia, cherry, sweetgum, bay, maple, dogwood, persimmon, sassafras, sumac, hickory, cabbage palm, blackberry, grape, viburnum, blueberry, bayberry, and smilax.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and cypress.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, or foliage used by wildlife or that provide cover and shade for some species of wildlife. Major soil properties that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and moisture. Examples of shrubs are sumac, waxmyrtle, huckleberry, blackberry, blueberry, bayberry, gallberry, yaupon, elderberry, American beautyberry, Japanese honeysuckle, and sawpalmetto.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, and slope. Examples of wetland plants are smartweed, wild millet, rushes, sedges, reeds, saltgrass, cordgrass, and cattail.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, killdeer, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Examples of wildlife attracted to these areas are wild turkey, woodcock, thrushes, vireos, warblers, woodpeckers, squirrels, bobcats, gray fox, opossum, raccoon, and deer.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. The kinds of wildlife attracted to this habitat include ducks, geese, herons, shore birds, rails, and kingfishers.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 14 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 14 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 14 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Sandy clay loam," for example, is soil material that is 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand. Other USDA texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, SP-SM.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 21. The estimated classification, without group index numbers, is given in table 14.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and in plasticity index is estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

Physical and chemical properties

Table 15 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of

water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Salinity is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of the nonirrigated soils. The salinity of individual irrigated fields is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of individual fields can differ greatly from the value given in table 15. Salinity affects the suitability of a soil for crop production, its stability when used as a construction material, and its potential to corrode metal and concrete.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Wind erodibility groups are made up of soils that have similar properties that affect their resistance to soil blowing if cultivated. The groups are used to predict the susceptibility of soil to blowing and the amount of soil lost as a result of blowing.

In this survey area, soils are in wind erodibility group 2 only. The soils are very highly erodible, but they can be used for crops if intensive measures to control soil blowing are used.

Soil and water features

Table 16 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist

chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. The water tables in 27 pedons representing 9 series were measured twice monthly for 3 consecutive years during the course of the soil survey. The pedons selected were typical of the series as mapped in the county and were as far removed from any artificial drainage as possible. The measured water tables for 8 of the major series are shown in table 17 for the years 1974 and 1975. Normal precipitation fell during that period. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations and the need for specific kinds of drainage systems. Such information is also needed to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Subsidence is the settlement of organic soils. Initial subsidence generally results from drainage. Total subsidence is initial subsidence plus the slow sinking that occurs over a period of several years as a result of the oxidation or compression of organic material.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 6 feet or more. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils.

Physical and chemical analyses of selected soils

By M.A. GRANGER, visiting assistant professor, and V.W. CARLISLE and R.E. CALDWELL, professors of soil science, Agricultural Experiment Stations, Soil Science Department, University of Florida.

Physical, chemical, and mineral properties of representative pedons sampled in Duval County are presented in tables 18, 19, and 20. The analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of soils analyzed are given in alphabetical order in the section "Soil series and morphology." Laboratory data and profile information for additional soils in Duval County as well as for other counties in Florida are on file at the Soil Science Department, University of Florida.

Soils were sampled from pits at carefully selected locations that represented typical pedons. Samples were air-dried, crushed, and sieved through a 2-mm screen. Most of the analytical methods used are outlined in Soil Survey Investigations Report No. 1 (*14*).

Particle size distribution was determined by using a modification of the Bouyoucos hydrometer procedure with sodium hexametaphosphate as the dispersant. Hydraulic conductivity, bulk density, and water content were determined on undisturbed core samples. Organic carbon was determined by a modification of the Walkley-Black wet combustion method. Extractable bases were obtained by leaching soils with ammonium acetate buffered at pH 7.0. Sodium and potassium in the extract were determined by flame photometry, and calcium and magnesium by atomic absorption spectroscopy. Extractable acidity was determined by the barium chloride-triethanolamine method at pH 8.2. Cation exchange capacity was calculated by summation of extractable bases and extractable acidity. Base saturation is the ratio of extractable bases to cation exchange capacity expressed in percent. The pH measurements were made with a glass electrode using a soil-water ratio of 1:1; a 0.01*M* calcium chloride solution in a 1:2 soil-solution ratio; and an N potassium chloride solution in a 1:1 soil-solution ratio.

Carbon, iron, and aluminum were extracted from suspected spodic horizons with 0.1*M* sodium phyrophosphate. Determination of iron and aluminum was by atomic absorption spectroscopy and of extracted carbon by the Walkley-Black wet combustion method. Mineralogy of the clay fraction was ascertained by X-ray diffraction. Peak heights were taken at 18 angstrom, 14 angstrom, 7.2 angstrom, 4.83 angstrom, and 4.31 angstrom positions. These positions represent montmorillonite, in-

terstratified expandible vermiculite, or 14-angstrom intergrades, kaolinite, gibbsite, and quartz, respectively. They were measured, summed, and normalized to give percentage of soil minerals identified in the X-ray diffractograms. This percentage is not an absolute quantity but a relative distribution of clay minerals in the clay fraction. The absolute percentage would require additional knowledge of particle size, crystallinity, and crystal lattice substitution.

Physical characteristics of important soils in the City of Jacksonville (Duval County) are reported in table 18. With few exceptions the soils are inherently sandy. Many pedons, including those of the Alpin, Fripp, Kershaw, Kureb, Leon, Mandarin, Pottsburg, and Ridgeland soils, have sand texture and no more than about 6 to 7 percent clay throughout their profile to a depth of about 2 meters. Other pedons, such as those of the Albany, Blanton, Mascotte, Olustee, Pelham, and Sapelo soils, have textural increases of clay in the lower horizons. The Yonges and Stockade soils have a surface layer in which the clay content is greater than 10 percent and a subsoil in which the clay content is as much as 32 percent. In every instance the sand fraction of these soils is dominated by fine sand. Calculations of sand ratios arbitrarily using fine sand to very fine sand indicate some consistency with depth; however, variation of this ratio with depth in the subsoil of Fripp and Mascotte soils may imply inconsistencies due to lithology rather than pedogenesis.

The textural implication for sandy soils is droughtiness. Based on bulk densities and the moisture retained between 1/10 or 1/3 bars and 15 bars, these soils will hold as little as 2.0 centimeters of plant-available water in their upper 50 centimeters and as much as 25 centimeters in their upper 1 meter. Hydraulic conductivity is high in many of these soils—often in excess of 60 cm/hr.

Chemical properties are reported in table 19. Extractable bases, cation-exchange capacity (sum of cations), and base saturation are low. This is indicative of low natural fertility. Calcium and magnesium are the predominant bases, and there are no more than traces of potassium. This low content of potassium is further supported by the absence of appreciable quantities of weatherable minerals (not reported) in these soils. The cation exchange capacity is less than 10 meg/100 grams of soil in most pedons due primarily to their sandy nature and consequent small total surface area. Cation exchange capacities of surface Bh horizons are expectably relatively higher because of increased reactivity of the associated organic material. This phenomenon is exemplified by all surface horizons and the Bh horizons of Cornelia, Leon, Mandarin, Mascotte, Ridgeland, and Sapelo soils. Dominant cations are primarily acid forming, as implied by extractable acidity and the relatively low base saturation in all but the Yonges soil. Soils with low cation exchange capacities require only small amounts of bases to significantly alter their base status and soil reaction, at least in their upper horizons. Consequently, successful crop production requires small but frequent applications of fertilizers. Soils that have a high base status and high cation exchange capacity are more fertile.

Organic carbon in surface horizons ranged from more than 0.5 percent in the Fripp soil to more than 6 percent in the Mascotte soil. However, most soils have organic carbon content of about 1 to 2 percent in their surface horizon. The organic carbon content decreases with depth in all pedons except those that have a Bh horizon. Organic carbon content in the Bh horizon ranges from less than 0.5 percent in the weakly expressed subhorizons of Leon soils and in the lower sequum of Ridgeland soils to more than 3 percent in the Bh horizon of Mascotte soils. In its native form organic carbon appears to be the primary source of cation exchange capacity in the upper horizons of soils in Duval County. It is directly responsible for improving the physical condition and the nutrient and water retention capacities, particularly in the sandy soils. The lack of significant quantities of clay in these upper horizons dictates that the proper agronomic use of these soils includes programs for the conservation and maintenance of this vital component.

Soil reaction in calcium chloride (not shown in table 19) is uniformly low. There is a narrow range among horizons of the same pedon, and this seldom differs by more than 1 pH unit throughout the depth of the pedon. Soil reaction of the Yonges soil is the only exception; it ranges from pH 6.8 in the surface layer to about pH 7.7 in the subsoil. Correlation between pH and base saturation is neither always evident nor positive, but the degree of positive correlation is to some extent influenced by the cation exchange capacity. The higher the cation exchange capacity, the poorer the relationship because of the increased buffering associated with increased cation exchange capacity.

Mineralogy of the coarser fraction (more than 0.002 mm) is invariably siliceous—predominantly quartz in all pedons—and is not reported here. Crystalline components of the clay (less than 0.002 mm) are reported in table 20 for selected horizons of each sampled pedon even though the total clay content (table 18) in many of these soils is relatively low. In general the clay mineralogical suite is of montmorillonite, a 14 angstrom intergrade mineral, kaolinite, and quartz. Detectable amounts of gibbsite were noted in the subsoil of Albany, Kershaw, and Ridgeland soils, and detectable amounts of mica were noted in Albany, Blanton, Fripp, and Kershaw soils. Neither gibbsite nor mica was dominant in any pedon, although the subsoil of Ridgeland soils had gibbsite content of as much as 39 percent. Significant quantities of montmorillonite occur throughout Yonges, Pelham, and Stockade soils; in the surface horizon of Fripp, Kershaw, Mandarin, Ridgeland, and Sapelo soils; and in the Bh horizon of Leon and Cornelia soils. The presence of montmorillonite in the Bh horizon is thought to be no more than a transient phase having been rendered temporarily stable because of a coating or close association with the organic complex. However, its dominance in the argillic horizons of Mascotte, Yonges, Pelham, and Stockade soils is expected.

Kaolinite and 14 angstrom intergrade minerals occurred in most of the soils. In some instances, as in the Albany, Alpin, and Ridgeland soils, the 14 angstrom intergrade mineral decreased with a concomitant increase of kaolinite with depth. This trend is not universal, since Kershaw, Leon, Mascotte, and Sapelo soils increased in both kaolinite and 14 angstrom intergrade minerals with depth. In many pedons the clay-sized quartz content was relatively high but exhibited no consistent trend to increase or decrease with depth. With only a few exceptions, the clay content is not high enough for the clay mineralogy to significantly influence the management and use of these soils.

Engineering test data

Table 21 contains engineering test data made by the Soils Laboratory, Florida Department of Transportation, Bureau of Materials and Research, on some of the major soil series in the survey area. These tests were made to help evaluate the soils for engineering purposes. The classifications given are based on data obtained by mechanical analysis and by tests to determine liquid limits and plastic limits.

The mechanical analyses were made by combined sieve and hydrometer methods (*4*). In this method, the various grain-sized fractions are calculated on the basis of all the material in the soil sample, including that coarser than 2 millimeters in diameter. The mechanical analyses used in this method should not be used in naming textural classes of soils.

Compaction (or moisture-density) data are important in earthwork. If soil material is compacted at a successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of the soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic state; and the liquid limit is the moisture content at which the soil material changes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. The data on liquid limit and plasticity index in this table are based on laboratory tests of soil samples.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*13*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Albany series

The Albany series is a member of the loamy, siliceous, thermic family of Grossarenic Paleudults. It consists of nearly level to gently sloping, somewhat poorly drained, acid soils that formed in thick deposits of sandy and loamy materials. These soils occur on narrow to broad ridges and isolated knolls. Slopes range from 0 to 5 percent. Under natural conditions, the water table is at a depth of 10 to 30 inches for 1 to 3 months, and at a depth of 30 to 60 inches for 4 to 8 months or more during most years.

Albany soils are geographically associated with Blanton, Sapelo, Mascotte, and Pelham soils. Albany soils differ from Blanton soils by having a seasonal water table within 30 inches of the surface. Albany soils do not have a spodic horizon, whereas Sapelo and Mascotte soils have a spodic horizon within a depth of 30 inches. Albany soils differ from Pelham soils by not having gray colors in the upper portion of the A2 horizon and by being better drained.

Typical pedon of Albany fine sand, 0 to 5 percent slopes, 100 feet east of Biscayne Road, 1.75 miles north of Dunn Avenue, Land Grant 38, T. 1 N., R. 26 E.:

A1—0 to 3 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

A21—3 to 29 inches; light yellowish brown (10YR 6/4) fine sand; few fine faint yellow mottles; single grained; loose; slightly acid; gradual wavy boundary.

A22—29 to 50 inches; light gray (10YR 7/1) fine sand; common medium faint yellow (2.5Y 7/6) and few fine distinct reddish yellow mottles; single grained; loose; slightly acid; gradual smooth boundary.

B21t—50 to 63 inches; strong brown (7.5YR 5/8) sandy loam; common coarse distinct light gray (5Y 7/1) and red (2.5YR 4/8) mottles; weak fine subangular blocky structure; friable; medium acid; gradual wavy boundary.

B22tg—63 to 88 inches; light gray (5Y 7/1) sandy clay loam; few fine prominent red (10R 4/8) and common coarse prominent reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable; clay skins present on ped faces; strongly acid.

Solum thickness ranges from 60 to 96 inches. Soil reaction ranges from very strongly acid to slightly acid in the A horizon and from very

strongly acid to medium acid in the B2t horizon. Depth to the underlying argillic horizon is 44 to 76 inches.

The A1 horizon has hue of 10YR, value of 3 through 5, and chroma of 1, or value of 3 through 6 and chroma of 2. Thickness ranges from 3 to 5 inches. Texture is fine sand.

The upper part of the A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 3 or 4, or hue of 2.5Y, value of 6 through 8, and chroma of 4. The lower part has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 2, or hue of 10YR, value of 7, and chroma of 1. Thickness ranges from 38 to 58 inches. Texture is fine sand.

The B2t horizon has hue of 10YR and 5Y, value of 5 through 7, and chroma of 1 or 2; hue of 2.5Y, value of 5 through 7, and chroma of 2; or hue of 7.5YR, value of 5 or 6, and chroma of 8 with mottles in shades of brown, yellow, gray, and red. The B2tg part of the argillic horizon has dominant hue of 2.5Y or 5Y in the matrix and dominant chroma of 2 or less on ped surfaces. The B2t horizon extends to a depth of more than 80 inches. Texture is fine sandy loam or sandy clay loam.

Alpin series

The Alpin series is a member of the thermic, coated family of Typic Quartzipsamments. It consists of nearly level to sloping, excessively drained soils that formed in thick beds of sandy marine or sandy eolian deposits. These soils occur on broad upland ridges. Slopes are smooth to convex, ranging from 0 to 8 percent. The water table is below a depth of 72 inches throughout the year.

Alpin soils are geographically associated with Blanton, Kershaw, Kureb, Ortega, and Pottsburg soils. Alpin soils have lamellae, while the associated soils do not. In addition, Blanton soils have an argillic horizon within a depth of 40 to 80 inches. Kershaw and Ortega soils have moisture equivalent of less than 2 percent or less than 5 percent silt plus clay within a depth of 80 inches, and Pottsburg soils have a spodic horizon at a depth of more than 50 inches.

Typical pedon of Alpin fine sand, 0 to 8 percent slopes, 0.1 mile north of Moncrief Road and 1.5 miles west of Lem Turner Road, Land Grant 39, T. 1 S., R. 26 E.:

A1—0 to 5 inches; grayish brown (10YR 5/2) fine sand; weak fine granular structure; loose; strongly acid; clear smooth boundary.

A21—5 to 11 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

A22—11 to 30 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; very strongly acid; gradual smooth boundary.

A23—30 to 48 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; common white (10YR 8/2) streaks; very strongly acid; clear smooth boundary.

A2&B1—48 to 80 inches; mixed very pale brown (10YR 7/4) and white (10YR 8/2) fine sand; single grained; loose; common strong brown (7.5YR 5/8) loamy fine sand lamellae 2 to 25 millimeters thick and 1 to 5 inches apart; sand grains in lamellae are coated; lamellae are discontinuous in length within pedon; very strongly acid.

Solum thickness exceeds 80 inches. Soil reaction ranges from very strongly acid to strongly acid. Texture of the A1 horizon and all other horizons is fine sand except that lamellae are loamy fine sand or fine sandy loam. Lamellae begin at a depth of 40 to 70 inches and have a cumulative thickness of 1 to 6 inches within a depth of 80 inches.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2.

The A2 horizons have hue of 10YR, value of 5 through 8, and chroma of 3 through 6.

The A2 portion of the A2&B1 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 through 4. The B1 portion of this horizon has hue of 7.5YR, value of 5 or 6, and chroma of 6 through 8. Texture is loamy fine sand or sandy loam. Lamellae range in thickness from 2 to 25 millimeters and are 1 to 5 inches apart. They range from 5 centimeters to more than 1 meter in horizontal length and extend to a depth of more than 80 inches. Total combined thickness of lamellae 1 centimeter or more thick within a depth of 2 meters is less than 15 centimeters.

Blanton series

The Blanton series is a member of the loamy, siliceous, thermic family of Grossarenic Paleudults. It consists of nearly level to gently sloping, moderately well drained soils that formed in marine deposits of sandy and loamy sediments. These soils occur on narrow to broad ridges and isolated knolls. Slopes are smooth to convex, ranging from 0 to 5 percent. Under natural conditions, a perched water table is at a depth of 40 to 60 inches for 2 to 5 months during most years.

Blanton soils are geographically associated with Albany, Alpin, Sapelo, Mascotte, Pelham, and Ortega soils. Blanton soils differ from Albany soils in that they are better drained. Blanton soils have an argillic horizon below a depth of 40 inches, whereas Alpin soils have lamellae with a cumulative thickness of 1 to 6 inches within a depth of 80 inches. Blanton soils differ from Sapelo and Mascotte soils by not having a spodic horizon. Blanton soils differ from Pelham soils by not having an argillic horizon within a depth of 40 inches and in that they are better drained. Blanton soils differ from Ortega soils by having an argillic horizon.

Typical pedon of Blanton fine sand, 0 to 5 percent slopes, 0.7 mile south of Interstate 295, 0.3 mile east of Interstate 95, Land Grant 50, T. 1 S., R. 26 E.:

A1—0 to 3 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; loose; strongly acid; clear wavy boundary.

A21—3 to 9 inches; pale brown (10YR 6/3) fine sand; few fine distinct white and yellow mottles; single grained; loose; acid; gradual wavy boundary.

A22—9 to 21 inches; very pale brown (10YR 7/4) fine sand; few fine distinct white and few fine prominent yellowish red (5YR 5/6) mottles; single grained; loose; medium acid; gradual smooth boundary.

A23—21 to 36 inches; very pale brown (10YR 7/3) fine sand; few fine faint white and very pale brown mottles and few fine distinct strong brown mottles; single grained; loose; medium acid; gradual smooth boundary.

A24—36 to 54 inches; white (10YR 8/2) fine sand; few fine and medium faint very pale brown mottles; single grained; loose; medium acid; clear wavy boundary.

B21t—54 to 65 inches; yellowish brown (10YR 5/8) fine sandy loam; few medium faint very pale brown mottles, few fine prominent yellowish red (5YR 5/8) mottles, and common coarse faint strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B22t—65 to 80 inches; strong brown (7.5YR 5/8) fine sandy loam; many coarse prominent dark yellowish brown (10YR 4/4) mottles, many coarse distinct light gray (10YR 7/1) mottles, and few fine distinct yellowish red mottles with large pockets of pale yellow (2.5Y 7/4) fine sand; weak coarse subangular blocky structure; firm; strongly acid.

Solum thickness exceeds 80 inches. Soil reaction ranges from very strongly acid to medium acid in the A horizon and from very strongly acid to strongly acid in the B2t horizon.

Texture of the A horizon is fine sand. The A1 horizon has hue of 10YR, value of 3 through 5, and chroma of 1 or 2. Thickness ranges from 2 to 6 inches.

The upper part of the A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 3 through 8, and the lower part has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. Thickness ranges from 42 to 66 inches. Total thickness of the A horizon is 45 to 72 inches.

The B21t horizon has hue of 10YR, value of 5 through 7, and chroma of 3 through 8. Mottles are in shades of red, yellow, and brown. Texture is fine sandy loam or sandy clay loam.

The B22t horizon has hue of 10YR, value of 5, and chroma of 4 through 8; or value of 6 and chroma of 3 through 8; or hue of 2.5Y, value of 6, and chroma of 4. Mottles are in shades of red, gray, yellow, and brown. Texture is fine sandy loam or sandy clay loam.

Canaveral series

The Canaveral series is a member of the mixed, hyperthermic family of Aquic Udipsamments. It consists of nearly level to gently sloping, moderately well drained to somewhat poorly drained soils that formed in a thick marine deposit of sand and shell fragments. These soils occur on a broad ridge near the Atlantic coast. Slopes are smooth to convex and range from 0 to 5 percent. Under natural conditions, the water table is at a depth of 10 to 40 inches for 2 to 6 months and at a depth of 40 to 60 inches for 4 to 8 months during most years.

Canaveral soils are geographically associated with Fripp, Leon, Mandarin, Ortega, and Ridgeland soils. Canaveral soils differ from Leon, Mandarin, and Ridgeland soils by having shell fragments and by not having a spodic horizon. Canaveral soils differ from Fripp and Ortega soils by having shell fragments.

Typical pedon of Canaveral fine sand, 0 to 5 percent slopes, 1,100 feet east of Mayport Road, 2,300 feet south of Wonderwood Road, Land Grant 37, T. 2 S., R. 29 E.:

A1—0 to 6 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; mildly alkaline; gradual smooth boundary.

C1—6 to 17 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; mildly alkaline; abrupt wavy boundary.

C2—17 to 34 inches; light yellowish brown (10YR 6/4) fine sand mixed with multicolored shell fragments; single grained; loose; about 45 percent by volume shell fragments ranging in size to 3 millimeters; moderately alkaline; gradual wavy boundary.

C3—34 to 65 inches; very pale brown (10YR 7/4) shell fragments; single grained; loose; about 95 percent by volume shell fragments ranging in size to 3 millimeters; moderately alkaline.

Soil reaction ranges from neutral to moderately alkaline. The A horizon has hue of 10YR, value of 3 to 4, and chroma of 1 or 2. Thickness ranges from 1 to 8 inches. Texture is fine sand.

The C horizon has hue of 10YR, value of 5 through 7, and chroma of 2 through 4; and it extends to depth of more than 65 inches. Texture is sand or fine sand; in some pedons the soil is mixed with broken shell fragments, but in most pedons sand and shell fragments are stratified. Content of shell fragments ranges from 15 to 60 percent in the C1 and C2 horizons and to as much as 95 percent in the C3 horizon.

Cornelia series

The Cornelia series is a member of the the sandy, siliceous, thermic family of Arenic Haplohumods. It consists of level to gently sloping, excessively drained soils that formed in thick beds of marine sands. These soils occur on broad upland ridges. Slopes are smooth to convex and range from 0 to 5 percent. The water table is at a depth of more than 72 inches.

Cornelia soils are geographically associated with Kureb, Leon, and Ortega soils. Cornelia soils differ from Kureb soils by having a continuous spodic horizon, from Leon soils by being excessively drained, from Ortega soils by having a spodic horizon and by being better drained.

Typical pedon of Cornelia fine sand, 0 to 5 percent slopes, 2,700 feet north of Edgewood Drive and 3,000 feet east of Palmetto Avenue, Ft. George Island, Land Grant 37, T. 1 S., R. 29 E.:

A1—0 to 7 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; extremely acid; clear smooth boundary.

A21—7 to 13 inches; gray (10YR 5/1) fine sand; single grained; loose; extremely acid; gradual wavy boundary.

A22—13 to 39 inches; white (10YR 8/1) fine sand; single grained; loose; very strongly acid; abrupt irregular boundary.

B21h—39 to 44 inches; dark reddish brown (5YR 2/2) loamy fine sand; weak fine granular structure; friable; weakly cemented; sand grains well coated with organic matter; extremely acid; gradual wavy boundary.

B22h—44 to 53 inches; dark reddish brown (5YR 3/3) fine sand; weak fine subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

B23h—53 to 73 inches; dark yellowish brown (10YR 4/4) fine sand; weak fine subangular blocky structure; very friable; weakly cemented; sand grains coated with organic matter; very strongly acid; gradual smooth boundary.

B24h—73 to 92 inches; dark brown (7.5YR 4/4) fine sand; weak fine subangular blocky structure; very friable; weakly cemented; sand grains well coated with organic matter; strongly acid; gradual smooth boundary.

B25h—92 to 106 inches; reddish brown (5YR 4/4) fine sand; weak fine subangular blocky structure; very friable; weakly cemented; sand grains well coated with organic matter; strongly acid.

Soil reaction ranges from extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Thickness ranges from 2 to 8 inches. The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 or 2, and it is 23 to 42 inches thick. Total thickness of the A horizon ranges from 30 to 50 inches. Texture of the A horizon is fine sand.

The Bh horizon has hue of 5YR, value of 2 through 4, and chroma of 1 through 4; and it extends to a depth of more than 80 inches. It is weakly cemented, and the sand grains are well coated with organic matter. Texture of the Bh horizon is fine sand or loamy fine sand.

Fripp series

The Fripp series is a member of the mixed, thermic family of Typic Udipsamments. It consists of gently sloping to sloping, excessively drained soils that formed from marine sands reworked by wind and wave action. These soils occur on narrow to broad ridges along the Atlantic coast. Slopes are smooth to convex and range from 2 to 8 percent. The water table is at a depth of more than 72 inches.

Fripp soils are geographically associated with Aquic Quartzipsamments and Mandarin and Leon soils. Mandarin and Leon soils have a spodic horizon and are less well drained than Fripp soils. Aquic Quartzipsamments have a water table within a depth of 40 inches, while Fripp soils have a water table at a depth of more than 72 inches.

Typical pedon of Fripp fine sand, 2 to 8 percent slopes, 2.3 miles north of Park office, 1.4 miles east of Highway A1A, on northern tip of Little Talbot Island State Park:

A1—0 to 6 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; strongly acid; clear wavy boundary.

C—6 to 90 inches; very pale brown (10YR 8/3) fine sand; single grained; loose; common horizontal bands of rutile and ilmenite; slightly acid.

Content of silt plus clay is less than 5 percent, and texture is fine sand to a depth of more than 80 inches. Soil reaction ranges from strongly acid through mildly alkaline in the A1 horizon and from medium acid to mildly alkaline in the C horizon.

The A1 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Thickness ranges from 0 to 6 inches.

The C horizon has hue of 10YR, value of 7 and 8, and chroma of 2 or 3. Few to many horizontal bands of black heavy mineral, mostly rutile and ilmenite, occur in this horizon. This horizon extends to a depth of more than 80 inches.

Kershaw series

The Kershaw series is a member of the thermic, uncoated family of Typic Quartzipsamments. It consists of gently sloping to sloping, excessively drained, acid soils that formed in thick deposits of marine sands. These soils occur on broad ridges and isolated knolls. Slopes are smooth to convex and range from 2 to 8 percent. The water table is at a depth of more than 72 inches.

Kershaw soils are geographically associated with Alpin, Pottsburg, and Ortega soils. Kershaw soils differ from Alpin soils by not having lamellae within a depth of 80 inches. Kershaw soils have a thin A horizon and a pale brown to yellow C horizon, whereas Pottsburg soils have a spodic horizon at a depth of more than 50 inches. Kershaw soils differ from Ortega soils by showing no evidence of wetness within a depth of 40 to 60 inches.

Typical pedon of Kershaw fine sand, 2 to 8 percent slopes, 0.75 mile east of Monument Road, 1.25 miles south of Mt. Pleasant Road, NE1/4NE1/4SE1/4 sec. 4, T. 2 S., R. 28 E.:

A1—0 to 3 inches; very dark gray (10YR 3/1) fine sand; single grained; loose; few medium roots; strongly acid; clear smooth boundary.

C1—3 to 51 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; few to many fine roots; strongly acid; gradual smooth boundary.

C2—51 to 80 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; few fine roots; medium acid.

Soil reaction ranges from very strongly acid to medium acid. Texture of all horizons is fine sand to a depth of more than 80 inches. Content of silt plus clay within the 10- to 40-inch control section is less than 5 percent.

The A1 horizon has hue of 10YR, value of 3 through 5, and chroma of 1 or 2. Thickness ranges from 2 to 5 inches.

The C horizon has hue of 10YR, value of 6 through 8, and chroma of 3 through 8. It extends to a depth of more than 80 inches.

Kureb series

The Kureb series is a member of the thermic, uncoated family of Spodic Quartzipsamments. It consists of gently sloping to moderately steep, excessively drained soils that formed in thick beds of marine, fluvial, or eolian sands. These soils occur on broad upland ridges. Slopes are convex and range from 2 to 20 percent. The water table is at a depth of more than 72 inches.

Kureb soils are geographically associated with Cornelia, Kershaw, Mandarin, and Ortega soils. Kureb soils have a yellow to strong brown B horizon, whereas Cornelia soils have a spodic horizon of low value and chroma. Kureb soils differ from Kershaw soils by having an albic horizon, from Mandarin soils by not having a spodic horizon of low value and chroma and by being excessively drained, and from Ortega soils by having an albic horizon and by being excessively drained.

Typical pedon of Kureb fine sand, 2 to 8 percent slopes, 1 mile east of Monument Road, 0.75 mile south of the east end of Ft. Caroline Road, Land Grant 45, T. 1 S., R. 28 E.:

A1—0 to 4 inches; dark gray (10YR 4/1) fine sand; single grained; loose; very strongly acid; clear smooth boundary.

A2—4 to 16 inches; white (10YR 8/1) fine sand; single grained; loose; strongly acid; abrupt irregular boundary.

C&Bh—16 to 60 inches; yellow (10YR 7/6) fine sand; single grained; loose; common tongues filled with light colored fine sand from the A horizon above, outer edges of the tongues are dark reddish brown (5YR 3/2) and are weakly cemented; very strongly acid; gradual wavy boundary.

C—60 to 82 inches; very pale brown (10YR 8/4) fine sand; single grained; loose; few firm tongues of reddish brown (5YR 4/4); strongly acid.

Sand thickness exceeds 80 inches. Soil reaction ranges from very strongly acid to slightly acid. Texture of all horizons is fine sand.

The A1 horizon has hue of 10YR, value of 3 through 5, and chroma of 1. Thickness ranges from 1 to 4 inches. The A2 horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or 2. It is 5 to 25 inches thick.

The C part of the C&Bh horizon has hue of 10YR, value of 5 or 6, and chroma of 4 through 8. Thickness ranges from 16 to 47 inches. Common to many coarse tongues of A2 material are present in the C&Bh horizon. The Bh part occurs as thin (usually less than 2 inches thick), weakly cemented, discontinuous layers at the contact of the A2 horizon and the edges of the tongues of A2 material. The Bh part has hue of 10YR, value of 3 or 4, and chroma of 3 or 4; hue of 7.5YR, value of 4, and chroma of 2 through 4; or hue of 5YR, value of 3 or 4, and chroma of 2 through 4.

The C horizon has hue of 10YR, value of 6, and chroma of 4; or value of 7 and 8 and chroma of 4 through 8. It extends to a depth of more than 80 inches. In some pedons tongues of Bh horizon material extend downward into the C horizon.

Leon series

The Leon series is a member of the sandy, siliceous, thermic family of Aeric Haplaquods. It consists of nearly level, poorly drained soils that formed in thick beds of marine sands. These soils occur in broad flatwoods areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months or more during most years.

Leon soils are geographically associated with Mascotte, Ortega, Pottsburg, Ridgeland, and Wesconnett soils. Leon soils differ from Mascotte soils by not having an argillic horizon beneath the spodic horizon. Leon soils differ from Ortega soils by having a spodic horizon and by being

more poorly drained. Leon soils have a spodic horizon at a depth of less than 30 inches, whereas Pottsburg soils have a spodic horizon at a depth of more than 50 inches. Leon soils differ from Ridgeland and Wesconnett soils by having an albic horizon.

Typical pedon of Leon fine sand, 800 feet west of U.S. Highway 17, 1,600 feet north of Duval Road, NE1/4NW1/4NW1/4 sec. 20, T. 1 N., R. 27 E.:

A11—0 to 5 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; extremely acid; gradual smooth boundary.

A12—5 to 8 inches; dark gray (10YR 4/1) fine sand; single grained; loose; very strongly acid; gradual smooth boundary.

A2—8 to 18 inches; gray (10YR 6/1) fine sand; single grained; loose; strongly acid; abrupt smooth boundary.

B21h—18 to 26 inches; black (5YR 2/1) fine sand; moderate medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; extremely acid; gradual smooth boundary.

B22h—26 to 37 inches; very dark gray (5YR 3/1) fine sand; common medium faint black (N 2/0) splotches; weak medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual smooth boundary.

B3—37 to 45 inches; dark brown (10YR 4/3) fine sand; common fine faint very dark grayish brown mottles; weak fine subangular blocky structure; very friable; very strongly acid; gradual smooth boundary.

B'2h—45 to 80 inches; dark reddish brown (5YR 2/2) fine sand; weak fine subangular blocky structure; nonsticky; weakly cemented; sand grains well coated with organic matter; very strongly acid.

Soil reaction ranges from extremely acid to strongly acid, and in some pedons the reaction in the A horizons ranges to neutral where lime has been applied. Texture of all horizons is fine sand.

The A1 or Ap horizon has hue of 10YR or N, value of 2 through 4, and chroma of 1 or less. Thickness ranges from 3 to 9 inches. The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. It is 9 to 18 inches thick. Total thickness of the A horizon is less than 30 inches.

The B2h horizon has hue of 5YR, value of 2 or 3, and chroma of 1 through 4; or it has hue of 7.5YR, value of 3, and chroma of 2. Thickness ranges from 11 to 20 inches. This horizon is weakly cemented, and sand grains are well coated with organic matter.

The B3 horizon as described does not occur in all pedons. Where present, it has hue of 10YR, value of 4, and chroma of 2 or 3. Thickness ranges from 0 to 11 inches.

Some pedons also have an A'2 horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Thickness ranges from 0 to 18 inches.

The B'2h horizon has hue of 5YR, value of 2 or 3, and chroma of 1 through 3. It extends to a depth of more than 80 inches.

Lynn Haven series

The Lynn Haven series is a member of the sandy, siliceous, thermic family of Typic Haplaquods. It consists of nearly level, poorly drained soils that formed in thick beds of marine sand. These soils occur in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years.

Lynn Haven soils are geographically associated with Leon, Pottsburg, Ridgeland, Ortega, and Wesconnett soils. Lynn Haven soils differ from Ridgeland soils by having an albic horizon and from Leon and Pottsburg soils by having an umbric epipedon. In addition, Pottsburg soils have a spodic horizon at a depth of more than 50 inches. Lynn Haven soils differ from Ortega soils by having an umbric horizon and a spodic horizon and by being more poorly drained. Lynn Haven soils differ from Wesconnett soils by having an albic horizon, and in addition, Wesconnett soils are very poorly drained.

Typical pedon of Lynn Haven fine sand, 100 feet north of Yellow Bluff Road, 1.44 miles east of U.S. Highway 17, SE1/4NE1/4SW1/4 sec. 3, T. 1 N., R. 27 E.:

A11—0 to 7 inches; black (N 2/0) fine sand; weak fine granular structure; very friable; few uncoated sand grains; extremely acid; gradual wavy boundary.

A12—7 to 13 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; many uncoated sand grains; very strongly acid; gradual wavy boundary.

A2—13 to 21 inches; mixed light gray (10YR 7/1) and gray (10YR 6/1) fine sand; single grained; loose; many root channels filled with black (10YR 2/1) and very dark gray (10YR 3/1); very strongly acid; clear wavy boundary.

B21h—21 to 35 inches; black (5YR 2/1) fine sand; weak fine subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

B22h—35 to 48 inches; dark reddish brown (5YR 3/2) fine sand; weak fine subangular blocky structure; friable; few tongues of black (5YR 2/1) fine sand extend from above horizon; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

B31h—48 to 62 inches; dark reddish brown (5YR 2/2) fine sand; few fine faint dark brown mottles; moderate medium subangular blocky structure; friable; sand grains well coated with organic matter; strongly acid; gradual wavy boundary.

B32h—62 to 80 inches; dark brown (7.5YR 4/3) fine sand; moderate medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid.

Soil reaction ranges from extremely acid to strongly acid. Texture of all horizons is fine sand.

The A1 horizon has hue of 10YR or N, value of 2 through 4, and chroma of 1 or less. Thickness ranges from 11 to 17 inches.

The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It is 3 to 15 inches thick. Total thickness of the A horizons is less than 30 inches.

The B2h horizon has hue of 5YR, value of 2 or 3, and chroma of 1 through 4; hue of 10YR, value of 2 or 3, and chroma of 1 through 3; or hue of 7.5YR, value of 3, and chroma of 2. Thickness ranges from 9 to 30 inches. This horizon is weakly cemented, and sand grains are well coated with organic matter.

The B3h horizons have hue of 10YR and 7.5YR, value of 3 or 4, and chroma of 2 through 4; hue of 5YR, value of 2 through 4, and chroma of 2 through 6. Thickness ranges from 0 to 34 inches.

Some pedons have an A'2 horizon and a B'2h horizon. The A'2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 through 4. It is 0 to 15 inches thick. The B'2h horizon has hue of 10YR, value of 2 or 3, and chroma of 1 through 3; hue of N, value of 2 or 3, and chroma of 0. It extends to a depth of more than 80 inches.

Mandarin series

The Mandarin series is a member of the sandy, siliceous, thermic family of Typic Haplohumods. It consists of nearly level, somewhat poorly drained, acid soils that formed in thick beds of acid marine sands. These soils occur on narrow to broad ridges slightly higher than

the adjacent flatwoods. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of 20 to 40 inches for 4 to 6 months during most years. It is at a depth of 10 to 20 inches for periods of as much as 2 weeks in some years.

Mandarin soils are geographically associated with Leon, Mascotte, Ortega, and Pottsburg soils. Mandarin soils are somewhat poorly drained, whereas Leon and Mascotte soils have a water table above a depth of 10 inches for some periods during the year. Also, Mascotte soils have an argillic horizon below the spodic horizon. Mandarin soils differ from Ortega and Pottsburg soils by having a spodic horizon at a depth of less than 30 inches.

Typical pedon of Mandarin fine sand, 3,000 feet north of Atlantic Boulevard, 0.7 mile west of Girvin Road, NE1/4NW1/4 sec. 22, T. 2 S., R. 28 E.:

A1—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; extremely acid; clear wavy boundary.

A21—4 to 8 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; extremely acid; clear wavy boundary.

A22—8 to 26 inches; light gray (10YR 7/1) fine sand; single grained; loose; strongly acid; abrupt wavy boundary.

B21h—26 to 30 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine subangular blocky structure; very friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

B22h—30 to 35 inches; very dark brown (10YR 2/2) fine sand; few medium faint dark brown mottles; weak fine subangular blocky structure; very friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; clear wavy boundary.

B23h—35 to 40 inches; black (5YR 2/1) fine sand; few fine faint yellowish brown mottles; moderate medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

B3—40 to 46 inches; brown (10YR 5/3) fine sand; single grained; loose; medium acid; gradual smooth boundary.

A'21—46 to 56 inches; light gray (10YR 7/2) fine sand; single grained; loose; slightly acid; gradual wavy boundary.

A'22—56 to 62 inches; white (10YR 8/1) find sand; few medium faint very pale brown mottles; single grained; loose; neutral; gradual wavy boundary.

A'23—62 to 73 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; neutral; gradual wavy boundary.

B'2h—73 to 80 inches; black (10YR 2/1) fine sand; few fine distinct white mottles; weak fine subangular blocky structure; friable; weakly cemented; sand grains coated with organic matter; medium acid.

Soil reaction ranges from extremely acid to medium acid in the A and Bh horizons and from medium acid to neutral in the B3, A'2, and B'2h horizons. Texture of all horizons is fine sand.

The A1 horizon has hue of 10YR, value of 2 through 6, and chroma of 1; or it has hue of N, value of 3 through 5, and chroma of 0. Thickness ranges from 2 to 6 inches. The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. It is 14 to 24 inches thick. Total thickness of the A horizon is less than 30 inches.

The Bh horizon has hue of 2.5YR, value of 2.5 or 3, and chroma of 2 through 4; hue of 5YR, value of 2.5 or 3, and chroma of 1 through 4; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 2 or 3, and chroma of 1 through 3. Thickness ranges from 5 to 34 inches. This horizon is weakly cemented, and the sand grains are well coated with organic matter.

The B3 horizon occurs in most pedons. It has hue of 10YR, value of 4 through 6, and chroma of 2 through 4; or it has hue of 7.5YR, value of 4, and chroma of 2 through 4; or value of 5 and chroma of 4. It is 0 to 17 inches thick.

The A'2 horizons have hue of 10YR, value of 5 through 8, and chroma of 1 or 2.

The B'h horizon has the same color range as the Bh horizon. It extends to a depth of more than 80 inches. This horizon is weakly cemented, and the sand grains are coated with organic matter.

Mascotte series

The Mascotte series is a member of the sandy, siliceous, thermic family of Ultic Haplaquods. It consists of nearly level, poorly drained soils that formed in marine deposits of sandy and loamy sediments. These soils occur in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years.

Mascotte soils are geographically associated with Albany, Leon, Pelham, and Sapelo soils. Mascotte soils differ from Albany soils by having a spodic horizon. Mascotte soils have an argillic horizon, whereas Leon soils do not. Mascotte soils differ from Pelham soils by having a spodic horizon. Mascotte soils differ from Sapelo soils by having an argillic horizon at a depth of less than 40 inches.

Typical pedon of Mascotte fine sand, 500 feet north of Duval Station Road, 200 feet east of Starrett Road, Land Grant 37, T. 1 N., R. 27 E.:

A1—0 to 5 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; extremely acid; clear wavy boundary.

A21—5 to 8 inches; gray (10YR 5/1) fine sand; single grained; loose; very strongly acid; clear wavy boundary.

A22—8 to 15 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid; clear smooth boundary.

B21h—15 to 21 inches; black (5YR 2/1) loamy fine sand; weak fine subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; abrupt smooth boundary.

B22h—21 to 23 inches; very dusky red (2.5YR 2/2) loamy fine sand; moderate medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; clear wavy boundary.

B23h—23 to 25 inches; dark reddish brown (5YR 3/3) loamy fine sand; moderate medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; clear wavy boundary.

A'2&B3—25 to 28 inches; light gray (10YR 7/2) and dark brown (7.5YR 4/4) loamy fine sand; few fine faint brownish yellow and many fine faint light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; strongly acid; friable; clear wavy boundary.

B21tg—28 to 46 inches; coarsely mottled gray (10YR 6/1) and yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; slightly sticky; very strongly acid; gradual wavy boundary.

B22tg—46 to 58 inches; coarsely mottled light gray (N 7/0), strong brown (7.5YR 5/8), and red (10R 4/8) fine sandy loam; moderate fine subangular blocky structure; slightly sticky; strongly acid; gradual wavy boundary.

Cg—58 to 80 inches; gray (5Y 6/1) fine sand; common medium faint light brownish gray (10YR 6/2) mottles; single grained; nonsticky; medium acid.

Soil reaction ranges from extremely acid to strongly acid throughout the solum and from extremely acid to medium acid in the C horizon. Depth to the underlying argillic horizon is 29 to 38 inches.

The A1 or Ap horizon has hue of 10YR, value of 2 through 4, and chroma of 1. Thickness ranges from 3 to 8 inches. Texture is fine sand.

The A2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 or 2. It is 9 to 18 inches thick. Texture is fine sand. Total thickness of the A horizon is less than 30 inches.

The B2h horizon has hue of 2.5YR, value of 2 or 3, and chroma of 2 through 4; hue of 5YR, value of 2 or 3, and chroma of 1 through 3; hue of 7.5YR, value of 3 or 4, and chroma of 2 through 4; hue of 10YR, value of 2, and chroma of 1 or 2; or hue of N, value of 2, and chroma of 0. Texture is fine sand or loamy fine sand. Thickness ranges from 5 to 17 inches. This horizon is weakly cemented, and sand grains are well coated with organic matter.

The A'2&B3 horizon as described does not occur in all pedons. Where present, the A'2 part has hue of 10YR, value of 5 through 7, and chroma of 2 or 3. The B3 part has hue of 7.5YR, value of 4, and chroma of 4; or hue of 10YR, value of 3 through 5, and chroma of 3. It ranges in thickness from 0 to 16 inches. Texture is fine sand or loamy fine sand.

The B'2tg horizon has hue of N, value of 4 through 7, and chroma of 1 or 2; hue of N, value of 4 through 7, and chroma of 0; or hue of 2.5Y, value of 5 or 6, and chroma of 2. It has mottles in shades of yellow, brown, and red. Texture is fine sandy loam or sandy clay loam. Thickness ranges from 18 to 34 inches.

The C horizon has hue of 10YR or 5Y, value of 6, and chroma of 1 or 2. This horizon is fine sand, and it extends to a depth of 80 inches or more.

Maurepas series

The Maurepas series is a member of the euic, thermic family of Typic Medisaprists. It consists of nearly level, very poorly drained, organic soils that formed from herbaceous and woody fibrous hydrophytic plant remains. These soils occur in large drainageways and depressions. Slopes are smooth to concave, and slope is less than 1 percent. Under natural conditions, either the water table is at a depth of less than 10 inches or the soil is covered by water for 6 to 12 months during most years.

Maurepas soils are geographically associated with Leon, Pamlico, Pottsburg, Surrency, Tisonia, and Wesconnett soils. All of the associated soils are of mineral origin except Pamlico soils. Maurepas soils differ from Pamlico soils by being less acid and by having sapric horizons at a depth of more than 52 inches.

Typical pedon of Maurepas muck, 100 feet south of Timuquana Road and 700 feet east of the Ortega River, Land Grant 42, T. 3 S., R. 26 E.:

Oa1—0 to 55 inches; dark reddish brown (5YR 3/2) unrubbed and rubbed muck; about 30 percent fiber unrubbed, less than 5 percent fiber rubbed; weak medium subangular blocky structure; friable; estimated mineral content 20 percent; common woody fragments of roots, logs, and stumps; mildly alkaline; gradual smooth boundary.

Oa2—55 to 80 inches; black (N 2/0) unrubbed and rubbed muck; about 45 percent fiber unrubbed, less than 5 percent rubbed; massive, parts to weak medium subangular blocky structure; estimated mineral content 20 percent; common woody fragments of roots, logs, and stumps; moderately alkaline.

Soil reaction ranges from medium acid to moderately alkaline. The Oa horizon is well decomposed organic matter. It has hue of 10YR or 5YR, value of 2 or 3, and chroma of 1 or 2; or hue of N, value of 2, and chroma of 0. Before rubbing, the fiber content is 20 to 50 percent; after rubbing, the fiber content is 2 to 16 percent. Fibers are typically those of nonwoody plants, but some pedons contain fiber of woody plants. Content of woody fibers ranges from 10 to 30 percent, unrubbed, of the organic volume. Mineral content ranges from 10 to 30 percent. Thickness of organic horizons exceeds 65 inches. Underlying materials are sandy or clayey.

Olustee series

The Olustee series is a member of the sandy, siliceous, thermic family of Ultic Haplaquods. It consists of nearly level, poorly drained soils that formed in thick beds of sandy and loamy marine sediments. These soils occur in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 2 to 8 months during most years.

Olustee soils are geographically associated with Leon, Pelham, Pottsburg, Ridgeland, and Sapelo soils. Olustee soils differ from Leon soils by having an argillic horizon. Olustee soils have a spodic horizon, whereas Pelham soils do not. Olustee soils differ from Pottsburg soils by having a spodic horizon within a depth of 12 inches, by having an argillic horizon, and by being more poorly drained. Olustee soils differ from Ridgeland soils by having an argillic horizon. Olustee soils have an argillic horizon within a depth of 40 inches, whereas Sapelo soils have an argillic horizon below a depth of 40 inches.

Typical pedon of Olustee fine sand, 200 feet south of Interstate Highway 295, 250 feet west of Lem Turner Road, SW1/4SW1/4SW1/4 sec. 33, T. 1 N., R. 26 E.:

A1—0 to 6 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; extremely acid; clear smooth boundary.

B21h—6 to 11 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; weakly cemented; many uncoated sand grains; extremely acid; clear wavy boundary.

B22h—11 to 21 inches; black (5YR 2/1) fine sand; weak medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; clear wavy boundary.

A'2—21 to 36 inches; gray (10YR 5/1) fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

B'2tg—36 to 54 inches; gray (10YR 5/1) sandy clay loam; few fine prominent strong brown (7.5YR 5/8) and many medium distinct brownish yellow (10YR 6/8) mottles; many medium distinct reddish yellow (7.5YR 6/8) mottles that appear to be in old root channels; moderate medium subangular blocky structure; slightly sticky; very strongly acid; gradual wavy boundary.

C1g—54 to 64 inches; dark gray (10YR 4/1) fine sand; few fine faint gray mottles; few medium distinct strong brown (7.5YR 5/6) mottles that appear to be in old root channels; weak medium subangular blocky structure; nonsticky; very strongly acid; gradual wavy boundary.

C2g—64 to 80 inches; mixed light gray (5Y 7/1) and gray (5Y 6/1) fine sand; single grained; nonsticky; very strongly acid.

Depth to the underlying argillic horizon is 24 to 38 inches. Soil reaction ranges from extremely acid to strongly acid in the A and Bh horizons and is very strongly acid or strongly acid in the other horizons.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1. Thickness ranges from 5 to 9 inches. Texture is fine sand.

The B2h horizon has hue of 5YR and 7.5YR, value of 2 or 3, and chroma of 1 through 4; or hue of 10YR, value of 2 or 3, and chroma of 1 through 3. Thickness ranges from 13 to 28 inches. This horizon is weakly cemented, and sand grains are well coated with organic matter. Texture is fine sand.

The A'2 horizon has hue of 10 YR, value of 5 through 8, and chroma of 1 or 2. Some pedons have mottles in shades of yellow, brown, or black. Thickness ranges from 4 to 25 inches. Texture is fine sand.

The B'2g horizon has hue of 5Y, value of 4 through 7, and chroma of 1 through 3; or hue of 10YR, value of 4 through 7, and chroma of 1 or 2.

Some pedons have mottles in shades of yellow, brown, or red. Texture is fine sandy loam or sandy clay loam. Thickness ranges from 15 to 48 inches.

The C horizon has hue of 10YR or 5Y, value of 5 through 7, and chroma of 1 or 2. Some pedons have mottles in shades of yellow, red, or brown. Texture is fine sand or loamy fine sand. The C horizon extends to a depth of more than 80 inches.

Ortega series

The Ortega series is a member of the thermic, uncoated family of Typic Quartzipsamments. It consists of nearly level to gently sloping, moderately well drained, acid soils that formed in thick deposits of marine sands. These soils occur on narrow to broad ridges and isolated knolls. Slopes are smooth to convex and range from 0 to 5 percent. Under natural conditions, the water table is at a depth of 40 to 60 inches for more than 6 months.

Ortega soils are geographically associated with Pottsburg, Leon, Mandarin, and Kershaw soils. Ortega soils have a light yellowish brown to yellow C horizon whereas Pottsburg soils have a spodic horizon at a depth of 50 inches or more. Ortega soils differ from Leon soils by not having a spodic horizon and by being better drained. Ortega soils differ from Mandarin soils by not having a spodic horizon. Ortega soils differ from Kershaw soils by showing evidence of wetness within a depth of 40 to 60 inches.

Typical pedon of Ortega fine sand, 0 to 5 percent slopes, 1,100 feet east of St. Johns Bluff Road, 1.44 miles south of Beach Boulevard, NW1/4NW1/4SW1/4 sec. 5, T. 3 S., R. 28 E.:

A1—0 to 5 inches; grayish brown (10YR 5/2) fine sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

C1—5 to 33 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; strongly acid; clear wavy boundary.

C2—33 to 48 inches; very pale brown (10YR 7/4) fine sand; common fine and medium distinct white (10YR 8/2) and reddish yellow (7.5YR 6/8) mottles; single grained; loose; medium acid; clear smooth boundary.

C3—48 to 63 inches; white (10YR 8/1) fine sand; common medium distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) mottles; single grained; nonsticky; slightly acid; clear smooth boundary.

C4—63 to 82 inches; white (10YR 8/2) fine sand; common coarse distinct black (5YR 2/1) mottles; single grained; nonsticky; slightly acid.

Soil reaction ranges from very strongly acid to slightly acid throughout. Texture in all horizons is fine sand; silt plus clay content is less than 5 percent within a depth of 10 to 40 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. Thickness is 1 to 6 inches.

The C1 and C2 horizons have hue of 10YR, value of 5 through 7, and chroma of 3 through 8. Some pedons have mottles of a higher or lower chroma. Thickness ranges from 33 to 59 inches.

The C3 and C4 horizons have hue of 10YR, value of 7 or 8, and chroma of 1 or 2. Some pedons have mottles in shades of yellow, yellowish brown, strong brown, and black. The C4 horizon extends to a depth of more than 80 inches.

Pamlico series

The Pamlico series is a member of the sandy or sandy-skeletal, siliceous, dysic, thermic family of Terric Medisaprists. It consists of nearly level, very poorly drained, acid soils that formed from nonwoody fibrous hydrophytic plant remains overlying sandy mineral sediments. These soils occur on tributaries of major streams and in depressions and drainageways. Slopes are smooth to concave and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches or the soil is covered with water for more than 6 months during most years.

Pamlico soils are geographically associated with Leon, Lynn Haven, Maurepas, and Wesconnett soils. All of the associated soils are of mineral origin except Maurepas soils. Pamlico soils differ from Maurepas soils by being organic to a depth of less than 40 inches.

Typical pedon of Pamlico muck, 0.15 mile east of Chaffee Road, 0.4 mile south of Normandy Boulevard, NE1/4NW1/4 sec. 7, T. 3 S., R. 25 E.:

Oi—0 to 2 inches; spongy layer of partially decomposed and undecomposed moss, roots, leaves, and twigs; extremely acid.

Oa1—2 to 8 inches; black (N 2/0) muck; about 30 percent fiber, 15 percent rubbed; very weak subangular blocky structure; friable; extremely acid; gradual wavy boundary.

Oa2—8 to 32 inches; very dusky red (2.5YR 2/2) muck; about 25 percent fiber, 5 percent rubbed; very weak subangular blocky structure; friable; extremely acid; gradual wavy boundary.

Oa3—32 to 37 inches; dark brown (7.5YR 3/2) muck; less than 5 percent rubbed; friable; slightly sticky; extremely acid; gradual wavy boundary.

IIC1—37 to 62 inches; very dark grayish brown (10YR 3/2) fine sand; single grained; slightly sticky; strongly acid; gradual wavy boundary.

IIC2—62 to 80 inches; dark brown (7.5YR 3/2) fine sand; single grained; loose; strongly acid.

Depth to the underlying sandy material ranges from 18 to 40 inches.

The Oi horizon is a layer of partially decomposed and undecomposed moss, roots, leaves, and twigs. Reaction is extremely acid. Thickness ranges from 0 to 3 inches.

The Oa horizon has hue of 5YR or 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 2.5YR, value of 2 or 3, and chroma of 1 or 2; hue of 7.5YR, value of 3, and chroma of 2; or hue of N, value of 2 or 3, and chroma of 0. Before rubbing, the fiber content is 20 to 33 percent; after rubbing, the fiber content is 2 to 16 percent. Reaction is extremely acid. Thickness ranges from 18 to 38 inches.

The IIC horizons have hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 1 or 2. Texture is fine sand or loamy fine sand, and the horizon extends to a depth of 80 inches or more. Reaction ranges from extremely acid to strongly acid.

Pelham series

The Pelham series is a member of the loamy, siliceous, thermic family of Arenic Paleaquults. It consists of nearly level, poorly drained soils that formed in marine deposits of sandy and loamy sediments. These soils occur in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months and at a depth of 10 to 30 inches for 4 to 12 months or longer during most years.

Pelham soils are geographically associated with Albany, Mascotte, Olustee, Sapelo, and Yonges soils. Pelham soils differ from the Albany soils by having an argillic horizon

at a depth of 20 to 40 inches. Pelham soils do not have a spodic horizon, whereas Mascotte, Olustee, and Sapelo soils have a spodic horizon within a depth of 30 inches. Pelham soils have base saturation of less than 35 percent, have mixed mineralogy, are in a fine-loamy family, and are arenic, whereas Yonges soils have base saturation of more than 35 percent and are not arenic.

Typical pedon of Pelham fine sand, 0.12 mile south of Edgewood Avenue, 400 feet east of U.S. Highway 1, Land Grant 44, T. 1 S., R. 26 E.:

Ap—0 to 6 inches; very dark gray (10YR 3/1) fine sand; fine granular structure; friable; very strongly acid; clear wavy boundary.

A21—6 to 14 inches; grayish brown (10YR 5/2) fine sand; very fine granular structure; very friable; very strongly acid; gradual wavy boundary.

A22—14 to 21 inches; light gray (10YR 7/2) fine sand; few fine distinct yellow and strong brown mottles; single grained; loose; very strongly acid; clear wavy boundary.

B21tg—21 to 26 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct yellow (10YR 7/6) mottles and few fine distinct strong brown mottles; weak fine subangular blocky structure; friable; very strongly acid; clear wavy boundary.

B22tg—26 to 44 inches; light brownish gray (10YR 6/2) sandy clay loam; few fine distinct strong brown mottles and common medium distinct reddish yellow (7.5YR 7/6) mottles; moderate medium subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

B23tg—44 to 60 inches; light brownish gray (10YR 6/2) sandy clay loam; many coarse faint brownish yellow (10YR 6/6) mottles and common medium distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B24tg—60 to 69 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Solum thickness is 60 inches or more. Soil reaction is very strongly acid or strongly acid. Depth to the underlying argillic horizon is 20 to 37 inches.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1; or hue of N, value of 2 or 3, and chroma of 0. Thickness ranges from 2 to 8 inches.

The A2 horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2. It ranges from 14 to 29 inches in thickness. Total thickness of the A horizon is 20 to 40 inches. Texture is fine sand or loamy fine sand.

The B2tg horizon has hue of 2.5Y, 10YR, or N; value of 4 to 6; and chroma of 2 or less; or it has hue of 5Y, value of 4 through 6, and chroma of 1. Mottles are strong brown, yellowish brown, and yellowish red. The B2tg horizon ranges from 30 to 50 inches in thickness. Texture is fine sandy loam or sandy clay loam.

Pottsburg series

The Pottsburg series is a member of the sandy, siliceous, thermic family of Grossarenic Haplaquods. It consists of nearly level, somewhat poorly drained soils that formed in thick deposits of marine sands. These soils occur on slightly higher elevations in the flatwoods. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of 6 to 12 inches for 2 to 4 months and at a depth of 12 to 40 inches for 6 to 9 months or longer during most years.

Pottsburg soils are geographically associated with Kershaw, Leon, Mandarin, Ortega, Ridgeland, and Wesconnett soils. Pottsburg soils differ from Kershaw soils by having a spodic horizon at a depth of more than 50 inches and by being more poorly drained. Pottsburg soils have a spodic horizon at a depth of more than 50 inches, whereas Leon and Mandarin soils have a spodic horizon at a depth of less than 30 inches. Pottsburg soils differ from Ortega soils by having a spodic horizon and by not having a light yellowish brown C horizon above a depth of 40 inches. Pottsburg soils differ from Ridgeland and Wesconnett soils by having an albic horizon.

Typical pedon of Pottsburg fine sand, 0.2 mile east of U.S. Highway 1, 0.3 mile south of Greenland Road, NW1/4SE1/4SW1/4 sec. 7, T. 4 S., R. 28 E.:

A1—0 to 3 inches; gray (10YR 5/1) fine sand; weak fine granular structure; very friable; very strongly acid; gradual smooth boundary.

A21—3 to 10 inches; brown (10YR 5/3) fine sand; common fine faint light gray mottles; weak fine granular structure; very friable; medium acid; gradual wavy boundary.

A22—10 to 34 inches; grayish brown (10YR 5/2) fine sand; common coarse faint pale brown (10YR 6/3) and few fine faint yellowish brown mottles; single grained; loose; medium acid; gradual smooth boundary.

A23—34 to 57 inches; light gray (10YR 7/1) fine sand; few medium faint very pale brown mottles; single grained; loose; slightly acid; gradual smooth boundary.

B2h—57 to 80 inches; dark reddish brown (5YR 2/2) fine sand; common fine faint black mottles; weak fine subangular blocky structure; very friable; weakly cemented; sand grains well coated with organic matter; strongly acid.

Soil reaction ranges from very strongly acid to slightly acid in the A horizon and from very strongly acid to medium acid in the Bh horizon. Texture of all horizons is fine sand.

The A1 or Ap horizon has hue of 10YR, value of 2 through 5, and chroma of 1 or 2. Thickness ranges from 3 to 8 inches.

The A21 horizon has hue of 10YR, value of 4 through 7, and chroma of 2 or 3. It is 6 to 26 inches thick. The A22 and A23 horizons have hue of 10YR or 2.5Y, value of 5 through 8, and chroma of 1 or 2. Thickness of the A2 horizon ranges from 45 to 70 inches. Total thickness of the A horizons exceeds 50 inches.

The B2h horizon has hue of 5YR, 7.5YR, or 10YR; value of 2 through 4; and chroma of 2 through 4. It extends to a depth of 80 inches or more. The sand grains in this horizon are well coated with organic matter and are weakly cemented.

Ridgeland series

The Ridgeland series is a member of the sandy, mixed, thermic family of Typic Haplaquods. The weatherable minerals are too low in the profile to meet the requirements for a mixed family, but this difference does not alter the use and behavior of the soil. The series consists of nearly level, poorly drained, acid soils that formed in marine sands. These soils occur in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for brief periods of 2 to 4 weeks, at a depth of 10 to 20 inches for 2 to 4 months, and at a depth of 20 to 40 inches for most of the remainder of the year during most years.

Ridgeland soils are geographically associated with Leon, Lynn Haven, Ortega, Pottsburg, and Wesconnett soils. Ridgeland soils differ from Leon and Lynn Haven

soils by not having an albic horizon. Ridgeland soils differ from Ortega soils by having a spodic horizon and being more poorly drained. Ridgeland soils differ from Pottsburg soils by having a spodic horizon at a depth of 10 inches or less and by not having an albic horizon. Ridgeland soils are poorly drained, whereas Wesconnett soils are very poorly drained.

Typical pedon of Ridgeland fine sand, 1,000 feet west of Boney Road, 2,200 feet north of Cedar Point Road, SW1/4SE1/4NE1/ sec. 31, T. 1 N., R. 28 E.:

A1—0 to 6 inches; very dark gray (N 3/0) fine sand; weak fine granular structure; friable; extremely acid; clear smooth boundary.

B2h—6 to 16 inches; dark brown (7.5YR 3/2) fine sand; weak fine granular structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

A'2—16 to 31 inches; very pale brown (10YR 7/3) fine sand; few fine distinct brownish yellow mottles; single grained; nonsticky; strongly acid; gradual smooth boundary.

B'21h—31 to 39 inches; dark reddish brown (5YR 3/3) fine sand; weak fine subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; strongly acid; gradual smooth boundary.

B'22h—39 to 80 inches; black (5YR 2/1) fine sand; medium subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; strongly acid.

Soil reaction ranges from extremely acid to slightly acid. In some pedons reaction in the A horizon ranges to neutral where lime has been applied. Texture of all horizons is fine sand.

The A1 horizon has hue of 10YR or N, value of 2 through 4, and chroma of 1 or less. Thickness ranges from 5 to 10 inches.

The B2h horizon has hue of 5YR, 7.5YR, or 10YR; value of 2 or 3; and chroma of 1 through 3. It is 8 to 17 inches thick. This horizon is weakly cemented, and sand grains are well coated with organic matter.

The A'2 horizon has hue of 10YR, value of 6 or 7, and chroma of 1 through 3. It is 5 to 35 inches thick.

The B'2h horizon has hue of 5YR, or 10YR; value of 2 or 3; and chroma of 1 through 3. It extends to a depth of 80 inches. It is weakly cemented, and the sand grains are well coated with organic matter.

Sapelo series

The Sapelo series is a member of the sandy, siliceous, thermic family of Ultic Haplaquods. It consists of nearly level, poorly drained, acid soils that formed in thick deposits of loamy marine sediments. These soils occur in broad flatwood areas. Slopes are smooth to convex and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 4 months or more, and at a depth of 10 to 30 inches for 2 to 6 months during most years.

Sapelo soils are geographically associated with Mascotte, Olustee, Pelham, and Yonges soils. Sapelo soils differ from Mascotte soils by not having a Bt horizon within a depth of 40 inches, and from Olustee soils by having an albic horizon and by having an argillic horizon at a depth of more than 40 inches. Sapelo soils differ from Pelham soils by having a spodic horizon and an argillic horizon at a depth of more than 40 inches, and from Yonges soils by having a spodic horizon.

Typical pedon of Sapelo fine sand, 40 feet east of Oliver Road, 350 feet north of Terrell Road, SW1/4SE1/4NE1/4 sec. 20, T. 1 N., R. 26 E.:

A11—0 to 3 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; extremely acid; clear smooth boundary.

A12—3 to 6 inches; dark gray (10YR 4/1) fine sand; single grained; loose; very strongly acid; clear smooth boundary.

A2—6 to 23 inches; light brownish gray (10YR 6/2) fine sand; few fine faint light yellowish brown mottles; single grained; loose; slightly acid; clear wavy boundary.

B21h—23 to 30 inches; mixed black (5YR 2/1) and dark reddish brown (5YR 2/2) fine sand; weak fine subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; very strongly acid; gradual wavy boundary.

B22h—30 to 32 inches; mixed black (5YR 2/1), dark reddish brown (5YR 3/2), and very dusky red (2.5YR 2/2) fine sand; weak fine subangular blocky structure; friable; weakly cemented; sand grains coated with organic matter; very strongly acid; clear wavy boundary.

Bh&B3—32 to 38 inches; dark brown (10YR 4/3) fine sand; common coarse weakly cemented dark reddish brown (5YR 3/2) bodies; weak fine subangular blocky structure; very friable; strongly acid; gradual wavy boundary.

A'2—38 to 56 inches; very pale brown (10YR 7/4) fine sand; few fine faint and distinct dark yellowish brown and dark brown mottles; single grained; nonsticky; many medium roots; extremely acid; clear wavy boundary.

B'21tg—56 to 62 inches; gray (5Y 5/1) sandy clay loam; few fine distinct yellowish brown and brownish yellow mottles; weak fine subangular blocky structure; slightly sticky; strongly acid; gradual smooth boundary.

B'22tg—62 to 80 inches; gray (5Y 5/1) fine sandy loam; common medium distinct dark brown (10YR 4/3) and many coarse prominent yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; slightly sticky; strongly acid.

Soil reaction ranges from extremely acid to strongly acid in all horizons except the A horizon, which ranges from extremely acid to slightly acid. Depth to the underlying argillic horizon is 40 to 80 inches.

The A1 horizon has hue of 10YR, value of 2 through 4, and chroma of 1. Thickness ranges from 2 to 8 inches. Texture is fine sand.

The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It is 10 to 24 inches thick. Texture is fine sand. Total thickness of the A horizon is less than 30 inches.

The B2h horizon has hue of 5YR, 7.5YR, or 10YR; value of 2 through 4; and chroma of 1 through 4; or it has hue of N, value of 2, and chroma of 0. It ranges in thickness from 9 to 36 inches. Texture is fine sand.

The B3 portion of the B3&Bh horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. The Bh portion has the same color range as the B2h horizon. Texture is fine sand. Thickness ranges from 0 to 6 inches.

The A'2 horizon has hue of 10YR, value of 5 through 7, and chroma of 1 through 3; or it has hue of 2.5Y, value of 5 through 8, and chroma of 2 through 4. It is 2 to 18 inches thick. Texture is fine sand.

The B'2tg horizons have hue of 10YR, 2.5Y, or 5Y; value of 5 through 7; and chroma of 1 or 2. Texture is fine sandy loam or sandy clay loam. These horizons extend to a depth of more than 80 inches.

Stockade series

The Stockade series is a member of the fine-loamy, mixed, thermic family of Typic Umbraqualfs. It consists of nearly level, very poorly drained soils that formed in a thick bed of unconsolidated, moderately fine textured materials. These soils occur in shallow depressions and large drainageways. Slopes are concave and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches, or the soil is covered with water for more than 6 months during most years.

Stockade soils are geographically associated with Leon, Ortega, Pottsburg, and Ridgeland soils. Stockade soils have an argillic horizon, whereas Leon, Pottsburg, and

Ridgeland soils have a spodic horizon. In addition, Pottsburg soils have a sandy epipedon more than 50 inches thick. Stockade soils differ from Ortega soils by having an argillic horizon and by being more poorly drained.

Typical pedon of Stockade fine sandy loam, 2,000 feet north of Atlantic Boulevard, 1.5 miles west of Girvin Road, NW1/4NE1/4NE1/4 sec. 21, T. 2 S., R. 28 E.:

A1—0 to 12 inches; black (N 2/0) fine sandy loam; weak fine subangular blocky structure; very friable; common fine roots; strongly acid; gradual wavy boundary.

B21tg—12 to 26 inches; very dark gray (10YR 3/1) sandy clay loam; few fine distinct yellowish brown and few fine faint dark grayish brown mottles; weak medium subangular blocky structure; friable; slightly acid; gradual smooth boundary.

B22tg—26 to 46 inches; dark gray (10YR 4/1) sandy clay loam; weak medium subangular blocky structure; few fine brown sand streaks; friable; neutral; clear wavy boundary.

C1—46 to 65 inches; dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) fine sand; moderate medium granular structure; very friable; neutral.

Solum thickness ranges from 40 to 60 inches. Soil reaction ranges from strongly acid to slightly acid in the A horizon and from medium acid to neutral in the Bt and C horizons.

The A horizon has hue of N or 10YR, value of 2 or 3, and chroma of 1 or less. Thickness ranges from 10 to 20 inches. Texture is fine sandy loam.

The B2tg horizon has hue of 10YR, value of 3 or 4, and chroma of 1. It is 23 to 36 inches thick. Where color value is less than 4, organic matter content is less than 1 percent. Texture is sandy clay loam or fine sandy loam. Clay content ranges from 18 to 30 percent; silt content is less than 20 percent. Common fine or medium carbonate nodules occur in the lower portion of this horizon in some pedons. Thickness ranges from 26 to 44 inches.

The C horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It extends to a depth of 65 inches or more. Texture is fine sand or loamy fine sand.

Surrency series

The Surrency series is a member of the loamy, siliceous, thermic family of Arenic Umbric Paleaquults. Base saturation is slightly too high within the critical classification depth to meet the requirements for Ultisols, but this difference does not alter the use and behavior of the soil. The series consists of nearly level, very poorly drained, acid soils that formed in marine deposits of sandy and loamy sediments. These soils occur in small depressions and drainageways. Slopes are smooth to concave and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches or the soil is covered with water for 6 to 12 months during most years.

Surrency soils are geographically associated with Pottsburg, Leon, Mascotte, Olustee, Pelham, and Wesconnett soils. Surrency soils differ from Olustee and Mascotte soils by not having a spodic horizon, and from Pelham soils by having an umbric epipedon. Surrency soils have an argillic horizon, whereas Leon, Pottsburg, and Wesconnett soils have a spodic horizon.

Typical pedon of Surrency fine sand, 150 feet north of Owens Road, 1.5 miles west of Interstate Highway 95, SE1/4SE1/4NE1/4 sec. 23, T. 1 N., R. 26 E.:

A11—0 to 14 inches; black (N 2/0) loamy fine sand; common medium distinct gray (10YR 5/1) splotches; weak fine granular structure; very friable; very strongly acid; gradual smooth boundary.

A12—14 to 18 inches; dark brown (7.5YR 3/2) fine sand; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

A2—18 to 26 inches; light brownish gray (10YR 6/2) fine sand; few fine distinct strong brown mottles; single grained; nonsticky; very strongly acid; abrupt wavy boundary.

B21tg—26 to 38 inches; dark grayish brown (10YR 4/2) fine sandy loam; common medium faint light gray (10YR 7/2) and few fine faint dark brown mottles; weak fine subangular blocky structure; slightly sticky; very strongly acid; gradual smooth boundary.

B22tg—38 to 49 inches; dark gray (10YR 4/1) fine sandy loam; common medium faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; slightly sticky; very strongly acid; gradual wavy boundary.

B23tg—49 to 70 inches; greenish gray (5GY 6/1) fine sandy loam; weak coarse subangular blocky structure; slightly sticky; very strongly acid; gradual wavy boundary.

Cg—70 to 80 inches; greenish gray (5GY 5/1) sandy clay loam; massive; slightly sticky; extremely acid.

Solum thickness ranges from 60 to 80 inches or more. Soil reaction ranges from extremely acid to strongly acid.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 7.5YR, value of 3, and chroma of 2; or hue of N, value of 2 or 3, and chroma of 0. Texture of the A11 horizon is loamy fine sand, and texture of the A12 horizon is fine sand or loamy fine sand. Thickness of the A1 horizon ranges from 13 to 20 inches.

The A2 horizon has hue of 10YR, value of 4 through 7, and chroma of 1 or 2. It is 8 to 17 inches thick. Texture is fine sand. Total thickness of the A horizon is 20 to 37 inches.

The upper part of the B2tg horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 or 2. There are few to common grayish, brownish, or yellowish mottles. The lower part of the B2tg horizon has the same colors as the upper part, but also has color in hue of 5Y, value of 6 or 7, and chroma of 1 or 2; or it has hue of 5GY, value of 5 through 7, and chroma of 1. Texture is fine sandy loam or sandy clay loam. Thickness ranges from 24 to 50 inches.

The C horizon has hue of 10YR, 2.5Y, or 5Y; value of 5 through 7, and chroma of 2 or less; or it has hue of 5GY, value of 5 through 7, and chroma of 1. Texture is fine sand, loamy fine sand, fine sandy loam, or sandy clay loam. The C horizon extends to a depth of 80 inches or more.

Tisonia series

The Tisonia series is a member of the clayey, montmorillonitic, euic, thermic family of Typic Sulfihemists. It consists of level to nearly level, very poorly drained, organic soils that formed from nonwoody halophytic plant remains over fine textured sediments. These soils occur on broad tidal marshes. Slopes range from 0 to 1 percent. Under natural conditions, the water table is at a depth of less than 10 inches or the soil is covered with water for 6 to 12 months during most years. Tidal action inundates the soil twice daily.

Tisonia soils are geographically associated with Leon, Pamlico, Ridgeland, and Maurepas soils. Tisonia soils differ from Leon and Ridgeland soils by being organic instead of mineral. Tisonia soils have fine textured horizons within the control section, whereas Pamlico soils have sandy horizons and Maurepas soils do not have a mineral horizon within a depth of 65 inches. In addition, none of the associated soils has the sulfur content of Tisonia soils.

Typical pedon of Tisonia mucky peat, 100 feet east of Eagle Bend Island Boulevard, 1,000 feet north of Yellow Bluff Road, NW1/4NE1/4NW1/4 sec. 33, T. 2 S., R. 27 E.:

Oe—0 to 18 inches; dark grayish brown (2.5Y 4/2) mucky peat; about 60 percent fiber, 30 percent rubbed; massive; sodium pyrophosphate extract color is light gray (10YR 6/1); about 30 percent mineral material; 1.66 percent sulfur and 22.6 mmhos/cm conductivity in the upper 9 inches and 2.96 percent sulfur and 27.8 mmhos/cm conductivity in the lower 9 inches; slightly acid in water at field moisture (air dry pH 5.2 in 0.01M calcium chloride); gradual smooth boundary.

IIC—18 to 65 inches; dark olive gray (5Y 3/2) clay; massive; flows easily between the fingers when squeezed; 2.73 percent sulfur and 48.2 mmhos/cm conductivity in the upper 6 inches and 2.27 percent sulfur and 36.2 mmhos/cm conductivity in the remainder; n value is 2.86; neutral in water at field moisture (air dry pH 5.2 in 0.01M calcium chloride).

Sulfur content ranges from 1.5 to about 3.5 percent. The organic layers in all tiers are dominantly hemic materials. Thickness of the organic material is 16 to 27 inches. Reaction ranges from slightly acid to mildly alkaline in water throughout the profile in its natural state; after air drying, pH in 0.01M calcium chloride decreases to medium acid or lower. Conductivity of the saturation extract ranges from 22 to 51 mmhos/cm.

The Oe horizon has hue of 10YR, 7.5YR, 2.5Y, or 5Y; value of 2 through 4; and chroma of 2. Fiber content ranges from 35 to 80 percent unrubbed and from 20 to 40 percent rubbed.

The IIC horizon has hue of 10YR, 2.5Y, or 5Y; value of 3 through 5; and chroma of 1 or 2. It extends to a depth of more than 65 inches. Texture is clay. The material in this horizon flows easily between the fingers when squeezed. The n value is more than 1. There are no lenses of loamy fine sand and sandy loam at a depth of more than 40 inches, or the lenses range to common.

Wesconnett series

The Wesconnett series is a member of the sandy, siliceous, thermic family of Typic Haplaquods. It consists of nearly level, very poorly drained soils that formed in thick deposits of marine sands. These soils occur in shallow depressions and large drainageways. Slopes are smooth to concave and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of 0 to 10 inches or the soil is covered with water for 6 to 12 months during most years.

Wesconnett soils are geographically associated with Leon, Lynn Haven, Maurepas, Pamlico, Pottsburg, and Ridgeland soils. Wesconnett soils are very poorly drained, whereas Leon, Lynn Haven, and Ridgeland soils are poorly drained, and Pottsburg soils are somewhat poorly drained. In addition, Wesconnett soils differ from Leon, Lynn Haven, and Pottsburg soils by not having an albic horizon. Wesconnett soils differ from Pamlico and Maurepas soils by being of mineral origin.

Typical pedon of Wesconnett fine sand, 0.3 mile south of Plummer Road, 660 feet east of Nassau County line, NW1/4SE1/4NE1/4 sec. 11, T. 1 S., R. 24 E.:

A1—0 to 2 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; extremely acid; clear smooth boundary.

B21h—2 to 10 inches; black (N 2/0) fine sand; weak fine subangular blocky structure; friable; common fine and medium splotches of light gray; weakly cemented; many clean sand grains; extremely acid; diffuse smooth boundary.

B22h—10 to 26 inches; dark reddish brown (5YR 3/2) fine sand; weak fine subangular blocky structure; friable; common splotches of light gray; weakly cemented; many clean sand grains; extremely acid; gradual wavy boundary.

B23h—26 to 32 inches; dark brown (7.5YR 3/2) fine sand; weak fine subangular blocky structure; friable; common splotches of light gray; weakly cemented; many clean sand grains; very strongly acid; clear wavy boundary.

A'2—32 to 44 inches; pale brown (10YR 6/3) fine sand; common medium distinct dark brown (7.5YR 3/2) mottles; single grained; loose; strongly acid; clear wavy boundary.

B'21h—44 to 72 inches; reddish black (10R 2/1) fine sand; massive, breaks to weak coarse subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; strongly acid; gradual wavy boundary.

B'22h—72 to 80 inches; very dusky red (10R 2/2) fine sand; massive, breaks to weak coarse subangular blocky structure; friable; weakly cemented; sand grains well coated with organic matter; strongly acid.

Soil reaction ranges from extremely acid to slightly acid. Texture of all horizons is fine sand.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or it has hue of N, value of 2 through 4, and chroma of 0. Some pedons have mottles of gray or light gray. Thickness ranges from 2 to 8 inches.

The B2h horizon has hue of 10YR, value of 2 or 3, and chroma of 1; hue of 5YR, value of 2.5 or 3, and chroma of 1 or 2; hue of 7.5YR, value of 3 or 4, and chroma of 2; or hue of N, value of 2, and chroma of 0. This horizon is weakly cemented, and the sand grains are well coated with organic matter. The B21h horizon has mottles of gray or light gray in some pedons. Thickness ranges from 12 to 36 inches.

The A'2 horizon has hue of 10YR, value of 4 through 7, and chroma of 2 through 4. It is 10 to 32 inches thick.

The B'2h horizon has the same color range as the Bh horizon, but it also has color in hue of 10R or 2.5YR, value of 2.5, and chroma of 1 or 2. It extends to a depth of 80 inches or more. This horizon is weakly cemented, and the sand grains are well coated with organic matter.

Yonges series

The Yonges series is a member of the fine-loamy, mixed, thermic family of Typic Ochraqualfs. It consists of nearly level, poorly drained soils that formed in loamy marine sediments. These soils occur on low-lying areas of the Coastal Plain. Slopes are smooth to concave and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches for 2 to 6 months during most years.

Yonges soils are geographically associated with Mascotte, Pelham, Sapelo, and Stockade soils. Yonges soils differ from Mascotte and Sapelo soils by not having a spodic horizon. Yonges soils differ from Pelham soils by having an argillic horizon at a depth of less than 20 inches. Yonges soils differ from Stockade soils by not having a mollic epipedon.

Typical pedon of Yonges fine sandy loam, 600 feet east of Bulls Bay Road, 600 feet south of Pritchard Road, NE1/4SE1/4 sec. 34, T. 1 S., R. 25 E.:

Ap—0 to 3 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; many fine roots; neutral; clear smooth boundary.

A2—3 to 6 inches; gray (10YR 5/1) loamy fine sand; many medium faint light gray mottles; moderate fine granular structure; very friable; mildly alkaline; clear smooth boundary.

B21tg—6 to 25 inches; gray (10YR 6/1) sandy clay loam; many coarse distinct yellow (10YR 7/6) mottles and few fine faint yellowish brown mottles; moderate medium subangular blocky structure; very sticky; common large light gray (10YR 7/1) loamy fine sand streaks; many clay skins along fracture faces; moderately alkaline; gradual wavy boundary.

B22tg—25 to 31 inches; gray (10YR 6/1) and dark gray (10YR 4/1) sandy clay loam; many coarse faint brownish yellow mottles; moderate medium subangular blocky structure; very sticky; many medium and large soft calcium carbonate accumulations; many fine dark concretions (oxides); moderately alkaline; gradual wavy boundary.

B23tg—31 to 55 inches; gray (5Y 6/1), yellowish brown (10YR 5/6), and yellow (10YR 7/8) sandy clay loam; strong medium subangular blocky structure; very sticky; few medium and large soft calcium carbonate accumulations; few large dark gray (10YR 4/1) fine sandy loam streaks along root channels; moderately alkaline; gradual wavy boundary.

B24tg—55 to 65 inches; greenish gray (5GY 6/1) sandy clay loam; many coarse prominent mottles of yellowish brown (10YR 5/8); moderate medium subangular blocky structure; very sticky; olive (5Y 5/6) sandy loam streaks; moderately alkaline; gradual smooth boundary.

B3g—65 to 80 inches; dark greenish gray (5GY 4/1), greenish gray (5GY 5/1), and light olive brown (2.5Y 5/4) sandy clay loam; weak medium subangular blocky structure; sticky; common medium white (10YR 8/1) sandy loam streaks; moderately alkaline.

Solum thickness is 40 to 80 inches. Soil reaction ranges from slightly acid to mildly alkaline in the A horizon and from slightly acid to moderately alkaline in the B horizon.

Texture of the A1 or Ap horizon is fine sandy loam. The A1 or Ap horizon has hue of 10YR, value of 2, and chroma of 1, or value of 3 or 4 and chroma of 1 or 2. Thickness ranges from 3 to 7 inches.

The A2 horizon has hue of 10YR, value of 5 through 8, and chroma of 1 or 2. It is 3 to 10 inches thick. Total thickness of the A horizon is less than 20 inches. Texture of the A2 horizon is fine sandy loam.

The B2tg horizon has hue of 10YR or 5Y, value of 4 through 6, and chroma of 1 or 2, or it has hue of 5GY, value of 5 or 6, and chroma of 1. It has mottles of yellow, brown, or red. Thickness ranges from 33 to 61 inches. Texture is sandy clay loam.

The B3g horizon has hue of 2.5Y, value of 4 or 5, and chroma of 2 through 6; hue of 5Y, value of 4 through 6, and chroma of 1 through 4; or hue of 5GY, value of 5 through 7, and chroma of 1. The horizon is a mixture of these colors in some pedons, and in others, one of these colors is dominant and the horizon is mottled. Texture is sandy clay loam or fine sandy loam.

Yulee series

The Yulee series is a member of the fine-loamy, mixed, thermic family of Typic Haplaquolls. It consists of nearly level, very poorly drained soils that formed in loamy and clayey marine sediments. These soils occur in shallow depressions and large drainageways. Slopes are concave and range from 0 to 2 percent. Under natural conditions, the water table is at a depth of less than 10 inches or the soil is covered with water for more than 6 months.

Yulee soils are closely associated with Mascotte, Olustee, Pelham, Sapelo, and Yonges soils. Yulee soils differ from these other soils by not having an argillic horizon. Also, Mascotte, Olustee, and Sapelo soils differ from Yulee soils by having a spodic horizon.

Typical pedon of Yulee clay, 1.25 miles north of Thomas Road, 150 feet east of U.S. Highway 1, SE1/4SE1/4SW1/4 sec. 26, T. 1 N. R. 25 E.:

O1—2 inches to 0; partially decayed leaves, moss, and twigs.

A11—0 to 7 inches; black (N 2/0) clay; moderate fine granular structure; friable; strongly acid; gradual smooth boundary.

A12—7 to 14 inches; black (N 2/0) clay; few fine distinct yellowish brown mottles; weak medium subangular blocky structure; sticky; clay skins on ped faces; medium acid; gradual smooth boundary.

B21g—14 to 28 inches; very dark gray (10YR 3/1) sandy clay loam; few fine distinct strong brown mottles; weak coarse subangular blocky structure; slightly sticky; moderately alkaline; gradual smooth boundary.

B22g—28 to 40 inches; dark gray (10YR 4/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; slightly sticky; moderately alkaline; gradual smooth boundary.

B23g—40 to 48 inches; dark gray (5Y 4/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; slightly sticky; few fine light gray sand pockets; moderately alkaline; gradual smooth boundary.

B24g—48 to 66 inches; dark gray (5Y 4/1) sandy clay loam; many coarse prominent strong brown (7.5YR 5/8) and dark red (2.5YR 3/6) mottles; weak coarse subangular blocky structure; slightly sticky; few fine light gray sand pockets; moderately alkaline; gradual smooth boundary.

IIC1—66 to 75 inches; pale yellow (2.5Y 7/4) sandy clay loam; few fine prominent dark reddish brown and many fine distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; moderately alkaline; gradual wavy boundary.

IIC2—75 to 80 inches; coarsely mottled greenish gray (5BG 5/1), dark greenish gray (5BG 4/1), and olive (5Y 5/6) clay loam; massive; very friable; moderately alkaline.

Solum thickness exceeds 60 inches. Soil reaction ranges from strongly acid to mildly alkaline in the A horizon and from medium acid to moderately alkaline in the B and C horizons. Base saturation exceeds 50 percent throughout the profile.

The A1 horizon has hue of N, 5YR, or 10YR, value of 1 or 2, and chroma of 2 or less. Texture is clay. Thickness ranges from 10 to 19 inches.

The B2g horizon has hue of 10YR or 5Y, value of 3 through 5, and chroma of 1 or 2. It has mottles of yellow, brown, and red. Texture is sandy clay loam. Clay content ranges from 21 to 35 percent, and silt content, from 10 to 20 percent. Total thickness of the B2g horizon is 36 to 60 inches.

The C horizon has hue of 5Y, 2.5Y, 5BG, or 5GY, value of 4 through 7, and chroma of 4 or less. It has mottles of yellow, brown, or red. It extends to a depth of more than 80 inches. Texture is sandy clay loam or clay loam.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*16*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 22, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Psamment (*Psamm*, meaning sand, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Quartzipsamments (*Quartz*, meaning quartz horizons, plus *psamment*, the suborder of Entisols that have mainly a sandy texture).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Quartzipsamments.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is thermic, uncoated Typic Quartzipsamments.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

References

(1) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Barbour-Cooper Associates, Inc. 1968. Plan—1990. Jacksonville Area Planning Board. 71 pp., illus.

(4) Bouyoucos, G.J. 1962. Hydrometer method improved for making particle size analyses of soils. Agron. J. 54: 464-465.

(5) Coile, T.S., and F.X. Schumacher. 1960. Growth and yields of natural stands of southern pines. U.S. Dep. Agric. Misc. Publ. 50, 202 pp.

(6) Fairchild, Roy W. 1972. The shallow-aquifer system in Duval County, Florida. Fla. State Dep. Nat. Resour, and U.S. Geol. Surv., Report of Investigations No. 59, 50 pp., illus.

(7) Florida Department of Agriculture and Consumer Services. 1967. Conservation needs inventory. 200 pp.

(8) Klawitter, R.A., K.K. Young, and J.M. Case. 1970. Potential site index for wet pineland soils of the Coastal Plain. U.S. Dep. Agric., Forest Serv., 20 pp., illus.

(9) Leve, G.W. 1966. Ground water in Duval and Nassau Counties, Florida. Fla. State Board Conserv. and U.S. Geol. Surv., Report of Investigations No. 43. 91 pp., illus.

(10) Snell, L.J. and W. Anderson. 1970. Water resources of Northeast Florida. Fla. State Dep. Nat. Resour. and U.S. Geol. Surv., Report of Investigations No. 54., 77 pp., illus.

(11) Snodgrass, D. 1969. Preservation of historic and cultural resources. Jacksonville Area Planning Board. 28 pp., illus.

(12) Swanton, J.R. 1922. Early history of the Creek Indians and their neighbors. Smithsonian Institution, Bureau of American Ethnology, Bull. 73, Washington D.C.

(13) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus [Supplements replacing pp. 173-188 issued May 1962]

(14) United States Department of Agriculture. 1967. Soil survey laboratory methods and procedures for collecting soil samples. Soil Surv. Invest. Rep. 1, 50 pp., illus.

(15) United States Department of Agriculture. 1970. Soil survey interpretations for woodlands. Soil Conserv. Serv., Prog. Rep. W-16, 26 pp.

(16) United States Department of Agriculture. 1975. Soil taxonomy: a basic system for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(17) United States Department of Commerce. 1964. Climatic summary of the United States. Supplement for 1951 through 1960, Florida, Climatography of the United States No. 86-6, 61 pp., illus.

(18) United States Department of Commerce. 1972. Climate of the States. Climate of Florida, Climatography of the United States No. 60-8, 31 pp., illus.

(19) United States Department of Commerce. 1973. Local climatological data, annual summary with comparative data, Jacksonville, Florida. 4 pp., illus.

Glossary

Absorption field. The area into which a subsurface system of tile or perforated pipe distributes effluent from a septic tank into natural soil.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse textured (light textured) soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Cutting and filling. Removal of undesirable soil material and replacing with soil material suitable for the intended use.

Deep to water. Deep to permanent water table during dry seasons.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Excess humus. Too much organic matter for intended use.

Excess permeability. The rapid movement of water through the soil at rates adversely affecting the specified use.

Fast intake. The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

Fill area. Raise the surface level of the land to the desired level with suitable soil material.

Flatwoods. Broad, nearly level, low ridges of poorly drained, dominantly sandy soils characteristically vegetated with an open forest of pines and a ground cover of sawpalmetto and pineland threeawn.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Forb. Any herbaceous plant not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Good management. For growing grasses, crops, trees, or any plants, the use of recommended practices for obtaining and maintaining good production and maintaining and protecting the soil. Suitable management practices will vary with the product being grown and the kind of soil, such as: the fertilization program, erosion control measures to use, whether to lime, the amount of supplemental irrigation water to apply and when, and cultivating and harvesting methods.

Green-chop. Mechanically harvested forage fed to animals while it is fresh and succulent.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Land shaping. Rearrangement of soil materials by cutting and filling to form a more suitable site for the intended use.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Low strength. Inadequate strength for supporting loads.

Maintain even moisture content. Prevent soil from drying out by whatever appropriate or feasible method so as to prevent soil from shrinking.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Mulching. Spreading of a natural or artificial layer of plant residue or other materials on the soil surface.

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents that commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on exposure to repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade, whereas ironstone cannot be cut but can be broken or shattered with a spade. Plinthite is one form of the material that has been called laterite.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Soil blowing. Soil easily moved and deposited by wind.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsidence. The shrinking of an organic soil or a soil that contains semifluid layers to a lower level after the lowering of the water table.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Too clayey. Soil slippery and sticky when wet and slow to dry.

Too sandy. Soil soft and loose; droughty and low in fertility.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Water control. Regulate the water table according to the need of the intended use by canals, ditches, tile, pumping, or any other appropriate method.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Illustrations

Figure 1.—Industrial development along the waterfront in Jacksonville. The land area is mapped as Urban land.

Figure 2.—Part of the network of railroads and highways that serves the Jacksonville area. The area is mapped as Urban land.

Figure 3.—Ships being repaired at a major shipyard at the Port of Jacksonville. The land area is mapped as Urban land.

Figure 4.—New campus facilities with well designed parking lots to serve rapidly growing Duval County and surrounding areas. The soils are Ortega fine sand, 0 to 5 percent slopes.

Figure 5.—An area of Leon-Urban land complex that is about 25 to 45 percent covered by houses, streets, and driveways. The open areas and lawns are Leon fine sand.

Figure 6.—Area of Pottsburg fine sand being restocked with slash pine seedlings.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

[Information extracted from U.S. Department of Commerce, NOAA, "Local Climatological Data, Annual Summary with Comparative Data, Jacksonville, Florida, 1973" and "Climatography of the United States No. 86-6, Climatic Summary of the United States--Supplement for 1951 through 1960, Florida. Data recorded at Jacksonville International Airport, elevation 26 feet]

Month	Temperature					Precipitation				
	*Monthly normal mean	*Normal daily maximum	*Normal daily minimum	Mean number of days with temperature of--		*Normal total	Maximum total	Minimum total	Mean number of days with rainfall of--	
				90° F or higher	32° F or lower				0.10 inch or more	0.50 inch or more
	F	F	F			In	In	In		
January---	54.6	64.6	44.5	0	4	2.78	7.29	0.06	4	2
February--	56.3	66.9	45.7	0	3	3.58	8.85	0.52	6	2
March-----	61.2	72.2	50.1	0	1	3.56	10.18	0.18	5	3
April-----	68.1	79.0	57.1	2	0	3.07	11.61	0.17	4	2
May-------	74.3	84.6	63.9	9	0	3.22	10.43	0.61	5	2
June------	79.2	88.3	70.0	17	0	6.27	12.90	2.19	7	3
July------	81.0	90.0	72.0	24	0	7.35	16.21	2.71	11	5
August----	81.0	89.7	72.3	21	0	7.89	16.24	1.92	7	4
September-	78.2	86.0	70.4	10	0	7.83	19.36	1.02	10	5
October---	70.5	79.2	61.7	1	0	4.54	13.44	0.16	6	4
November--	61.2	71.4	51.0	0	1	1.79	7.85	Trace	2	1
December--	55.4	65.6	45.1	0	3	2.59	7.09	0.04	3	2
Year---	68.4	78.1	58.7	84	12	54.47	**82.27	**31.76	70	35

*Climatological normal (1941-70).
**Maximum total in 1947.
**Minimum total in 1954.

TABLE 2.--FREEZE DATA

[Information extracted from U.S. Department of Commerce, NOAA, "Climatography of the United States No. 60-8, Climate of Florida, Revised June 1972." Data recorded at Jacksonville International Airport, elevation 26 feet]

Freeze threshold temperature	Mean date of last spring occurrence	Mean date of first fall occurrence	Mean number of days between dates	Years of record, spring	Number of occurrences in spring	Years of record, fall	Number of occurrences in fall
32	February 6	December 16	313	30	24	30	15
28	January 22	December 21	336	30	17	30	11
24	January 6	December 28	356	30	8	30	5
20	*	*	*	30	2	30	0
16	*	*	*	30	0	30	0

*Frequency of occurrence in either spring or fall is 1 year in 10, or less.

TABLE 3.--POTENTIALS AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP

[See text for definition of potential ratings. To reach soil potential, restrictive features must be overcome]

Map unit	Extent of area	Community development	Improved pasture	Pine woodland
	Pct			
1. Aquic Quartzipsamments-Fripp	1	Medium: floods.	Low: droughty.	Low: droughty.
2. Kershaw-Ortega	6	High	Low: droughty.	Low: droughty.
3. Mandarin-Kureb	3	High	Low: droughty, low fertility.	Medium: droughty.
4. Leon-Ortega	7	Medium: wetness.	Medium: wetness, droughty.	Medium: wetness.
5. Leon-Ridgeland-Wesconnett	34	Medium: wetness.	Medium: wetness.	Medium: wetness.
6. Pelham-Mascotte-Sapelo	36	Medium: wetness.	High: wetness.	High: wetness.
7. Wesconnett-Maurepas-Stockade	5	Low: wetness, floods.	Medium: wetness, floods.	High: wetness, floods.
8. Tisonia	8	Very low: wetness, floods, low strength, corrosivity.	Very low: wetness, floods, excess salt, low strength.	Very low: wetness, floods, excess salt.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Albany fine sand, 0 to 5 percent slopes	12,895	2.6
2	Alpin fine sand, 0 to 8 percent slopes	2,460	0.5
3	Aquic Quartzipsamments	4,320	0.9
4	Arents	12,785	2.6
5	Arents, sanitary landfill	660	0.1
6	Beaches	820	0.2
7	Blanton fine sand, 0 to 5 percent slopes	2,000	0.4
8	Canaveral fine sand, 0 to 5 percent slopes	160	*
9	Cornelia fine sand, 0 to 5 percent slopes	1,540	0.3
10	Fripp fine sand, 2 to 8 percent slopes	1,050	0.2
11	Kershaw fine sand, 2 to 8 percent slopes	12,825	2.6
12	Kershaw-Urban land complex	9,235	1.9
13	Kershaw fine sand, smoothed	1,235	0.2
14	Kureb fine sand, 2 to 8 percent slopes	2,345	0.5
15	Kureb fine sand, 8 to 20 percent slopes	375	0.1
16	Leon fine sand	64,200	12.9
17	Leon-Urban land complex	7,485	1.5
18	Lynn Haven fine sand	13,745	2.8
19	Mandarin fine sand	13,495	2.7
20	Mascotte fine sand	22,080	4.4
21	Mascotte-Urban land complex	7,165	1.4
22	Maurepas muck	8,680	1.7
23	Olustee fine sand	15,335	3.1
24	Ortega fine sand, 0 to 5 percent slopes	27,370	5.5
25	Pamlico muck	5,175	1.0
26	Pelham fine sand	48,075	9.7
27	Pelham-Urban land complex	4,610	0.9
28	Pits	1,495	0.3
29	Pottsburg fine sand	29,260	5.9
30	Ridgeland fine sand	25,335	5.1
31	Sapelo fine sand	23,170	4.7
32	Stockade fine sandy loam	6,020	1.2
33	Surrency fine sand	15,985	3.2
34	Tisonia mucky peat	34,680	7.0
35	Urban land	11,565	2.3
36	Wesconnett fine sand	33,055	6.7
37	Yonges fine sandy loam	4,215	0.8
38	Yulee clay	8,105	1.6
	Water	2,275	0.5
	Total	497,280	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF PASTURES

[Yields are those that can be expected under a high level of management. The estimates were made in 1976. Absence of a yield figure indicates that the soil is not suited to or is seldom used for that type of pasture]

Soil name and map symbol	Bahiagrass	Improved bermudagrass	Grass-clover
	AUM*	AUM*	AUM*
1. Albany	7.0	8.0	---
2. Alpin	6.0	7.0	---
3**. Aquic Quartzipsamments			
4**, 5**. Arents			
6**. Beaches			
7. Blanton	7.5	8.0	---
8. Canaveral	---	---	---
9. Cornelia	3.5	3.5	---
10. Fripp	---	---	---
11. Kershaw	3.5	3.5	---
12. Kershaw	---	---	---
13. Kershaw	3.5	3.5	---
14. Kureb	---	---	---
15. Kureb	---	---	---
16. Leon	7.5	8.0	10.0
17. Leon	---	---	---
18. Lynn Haven	7.5	8.0	10.0
19. Mandarin	6.0	6.5	---
20. Mascotte	8.0	9.0	11.0
21. Mascotte	---	---	---
22. Maurepas	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF PASTURES--Continued

Soil name and map symbol	Bahiagrass	Improved bermudagrass	Grass-clover
	AUM*	AUM*	AUM*
23------------------------- Olustee	8.5	9.5	11.5
24------------------------- Ortega	6.0	6.5	---
25------------------------- Pamlico	---	---	---
26------------------------- Pelham	6.0	8.0	10.0
27------------------------- Pelham	---	---	---
28**. Pits			
29------------------------- Pottsburg	7.0	7.5	---
30------------------------- Ridgeland	7.5	8.0	10.0
31------------------------- Sapelo	7.5	8.0	10.0
32------------------------- Stockade	11.0	12.0	14.0
33------------------------- Surrency	---	---	---
34------------------------- Tisonia	---	---	---
35**. Urban land			
36------------------------- Wesconnett	---	---	---
37------------------------- Yonges	11.0	12.0	14.0
38------------------------- Yulee	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, or five hogs) for a period of 30 days.

** See map unit description for the composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas and areas of complexes made up of a soil and Urban land are excluded. Absence of an entry means no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	---	---	---	---	---
II	---	---	---	---	---
III	87,150	---	57,780	29,370	---
IV	209,010	---	206,550	2,460	---
V	15,985	---	15,985	---	---
VI	48,250	---	33,055	15,195	---
VII	39,790	---	21,960	17,830	---
VIII	34,680	---	34,680	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

Soil name and map symbol	Ordi- nation symbol	Management concerns					Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortal- ity	Wind- throw hazard	Plant competition	Common trees	Site index	
1 Albany	3w	Slight	Moderate	Moderate	Slight	Moderate	Loblolly pine Slash pine Longleaf pine	80 80 67	Loblolly pine, slash pine.
2 Alpin	3s	Slight	Moderate	Moderate	Slight	Slight	Loblolly pine Slash pine Longleaf pine	85 80 70	Slash pine, loblolly pine.
7 Blanton	3s	Slight	Moderate	Moderate	Slight	Moderate	Slash pine Loblolly pine Longleaf pine	80 80 70	Slash pine.
8 Canaveral	4s	Slight	Severe	Severe	Slight	Moderate	Sand pine Slash pine	70 70	Slash pine.
9 Cornelia	5s	Slight	Severe	Severe	Slight	Moderate	Slash pine Longleaf pine Live oak Southern magnolia	65 65 --- ---	Sand pine.
10 Fripp	5s	Slight	Moderate	Moderate	Slight	-----------	Slash pine Longleaf pine Loblolly pine	65 60 65	Sand pine.
11 Kershaw	5s	Slight	Moderate	Severe	Slight	Slight	Slash pine Longleaf pine	65 55	Sand pine.
12*: Kershaw	5s	Slight	Moderate	Severe	Slight	Slight	Slash pine Longleaf pine	65 55	Sand pine.
Urban land.									
13 Kershaw	5s	Slight	Moderate	Severe	Slight	Slight	Slash pine Longleaf pine	65 55	Sand pine.
14, 15 Kureb	5s	Slight	Severe	Severe	--------	-----------	Longleaf pine Slash pine Sand pine	50 60 ---	Sand pine.
16 Leon	4w	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine Longleaf pine	70 65	Slash pine.
17*: Leon	4w	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine Longleaf pine	70 65	Slash pine.
Urban land.									

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
18 Lynn Haven	3w	Slight	Moderate, drained	Moderate, drained	---	---	Slash pine	80	Slash pine, loblolly pine.
							Loblolly pine	80	
							Longleaf pine	70	
							Pond pine	70	
19 Mandarin	4s	Slight	Moderate	Severe	Slight	Moderate	Slash pine	70	Slash pine, sand pine.
							Longleaf pine	60	
20 Mascotte	3w	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, loblolly pine.
							Loblolly pine	80	
							Longleaf pine	70	
21*:									
Mascotte	3w	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, loblolly pine.
							Loblolly pine	80	
							Longleaf pine	70	
Urban land.									
23 Olustee	3w	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine, loblolly pine.
							Loblolly pine	80	
							Longleaf pine	70	
24 Ortega	3s	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	Slash pine.
							Longleaf pine	75	
26 Pelham	2w	Slight	Severe	Severe	---	---	Slash pine	90	Slash pine, loblolly pine.
							Loblolly pine	90	
							Longleaf pine	74	
							Sweetgum	---	
							Blackgum	---	
							Water oak	---	
27*:									
Pelham	2w	Slight	Severe	Severe	---	---	Slash pine	90	Slash pine, loblolly pine.
							Loblolly pine	90	
							Longleaf pine	74	
							Sweetgum	---	
							Blackgum	---	
							Water oak	---	
Urban land.									
29 Pottsburg	3w	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine	80	Slash pine.
							Longleaf pine	70	
30 Ridgeland	3w	Slight	Moderate	Moderate	---	---	Loblolly pine	80	Loblolly pine, slash pine, longleaf pine.
							Slash pine	80	
							Longleaf pine	70	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns					Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
31 Sapelo	3w	Slight	Moderate	Moderate	---	---	Loblolly pine Slash pine Longleaf pine	77 77 65	Loblolly pine, slash pine.
32 Stockade	1w	Slight	Severe	Severe	Moderate	Severe	Sweetgum Water oak Blackgum Swamp chestnut oak	100 100 100 100	
33 Surrency	2w	Slight	Severe	Severe	Slight	Severe	Loblolly pine Slash pine Sweetgum Blackgum Water oak Baldcypress Water tupelo	95 90 90 --- --- --- ---	Loblolly pine, slash pine, sweetgum, American sycamore, water tupelo.
36 Wesconnett	2w	Slight	Severe	Severe	Slight	Severe	Slash pine Longleaf pine Sweetgum Baldcypress Water oak	90 80 --- --- ---	Slash pine.
37 Yonges	1w	Slight	Severe	Severe	Moderate	Severe	Loblolly pine Sweetgum Water oak	105 100 100	Loblolly pine, slash pine, sweetgum, American sycamore, water tupelo.
38 Yulee	1w	Slight	Severe	Severe	Moderate	Severe	Sweetgum Water oak Blackgum Swamp chestnut oak	100 100 100 100	

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 8.--BUILDING SITE DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1----------------- Albany	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
2----------------- Alpin	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
3*. Aquic Quartzipsamments					
4*, 5*. Arents					
6*. Beaches					
7----------------- Blanton	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight------------	Slight.
8----------------- Canaveral	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
9----------------- Cornelia	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight------------	Slight.
10---------------- Fripp	Severe: cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
11---------------- Kershaw	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
12*:					
Kershaw-----------	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
Urban land.					
13---------------- Kershaw	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
14---------------- Kureb	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
15---------------- Kureb	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
16---------------- Leon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
17*:					
Leon--------------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.					
18---------------- Lynn Haven	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: corrosive, wetness.	Severe: wetness.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
19------------------ Mandarin	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
20------------------ Mascotte	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Severe: wetness.
21*:					
Mascotte-----------	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Severe: wetness.
Urban land.					
22------------------ Maurepas	Severe: floods, wetness, cutbanks cave.	Severe: floods, low strength, excess humus.	Severe: floods, low strength, excess humus.	Severe: floods, low strength, excess humus.	Severe: floods, low strength, excess humus.
23------------------ Olustee	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Severe: wetness.
24------------------ Ortega	Severe: cutbanks cave.	Slight-------------	Moderate: wetness.	Slight-------------	Slight.
25------------------ Pamlico	Severe: floods, wetness.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
26------------------ Pelham	Severe: floods, wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
27*:					
Pelham-------------	Severe: floods, wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Urban land.					
28*. Pits					
29------------------ Pottsburg	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
30------------------ Ridgeland	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
31------------------ Sapelo	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
32------------------ Stockade	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
33------------------ Surrency	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.

See footnote at end of table.

TABLE 8.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
34----------------- Tisonia	Severe: too clayey, floods, wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, low strength.
35*. Urban land					
36----------------- Wesconnett	Severe: wetness, floods, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
37----------------- Yonges	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
38----------------- Yulee	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness, floods.

* See map unit description for the composition and behavior characteristics of the map unit.

TABLE 9.--SANITARY FACILITIES

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils. Absence of an entry means soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1----- Albany	Severe: wetness.	Severe: seepage.	Severe: wetness.	Moderate: wetness.	Fair: too sandy.
2----- Alpin	Slight-----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
3*. Aquic Quartzipsamments					
4*, 5*. Arents					
6*. Beaches					
7----- Blanton	Slight-----	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: too sandy, seepage.
8----- Canaveral	Severe: wetness.	Severe: seepage, wetness.	Severe: too sandy, seepage, wetness.	Severe: seepage.	Poor: too sandy, seepage.
9----- Cornelia	Slight-----	Severe: seepage.	Severe: too sandy.	Slight-----	Poor: too sandy.
10----- Fripp	Slight-----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
11----- Kershaw	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
12*: Kershaw-----	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
Urban land.					
13----- Kershaw	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
14----- Kureb	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
15----- Kureb	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
16----- Leon	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy, wetness.
17*: Leon-----	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy, wetness.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
17*: Urban land.					
18: Lynn Haven	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
19: Mandarin	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy.
20: Mascotte	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: too sandy, seepage, wetness.
21*: Mascotte	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: too sandy, seepage, wetness.
Urban land.					
22: Maurepas	Severe: floods, wetness.	Severe: floods, seepage, excess humus.	Severe: floods, seepage, excess humus.	Severe: floods, wetness, seepage.	Poor: wetness, excess humus.
23: Olustee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: too sandy, seepage, wetness.
24: Ortega	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
25: Pamlico	Severe: wetness, floods.	Severe: wetness, floods, excess humus.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness, excess humus, hard to pack.
26: Pelham	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
27*: Pelham	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
Urban land.					
28*. Pits					
29: Pottsburg	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
30-------------------- Ridgeland	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
31-------------------- Sapelo	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, too sandy.
32-------------------- Stockade	Severe: wetness, floods.	Severe: wetness, seepage.	Severe: wetness, seepage, floods.	Severe: wetness, seepage, floods.	Poor: wetness.
33-------------------- Surrency	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
34-------------------- Tisonia	Severe: floods, wetness, percs slowly.	Severe: floods, excess humus, wetness.	Severe: floods, excess humus, wetness.	Severe: floods, wetness.	Poor: excess humus, wetness, hard to pack.
35*. Urban land					
36-------------------- Wesconnett	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: too sandy, wetness, seepage.
37-------------------- Yonges	Severe: wetness, floods, percs slowly.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
38-------------------- Yulee	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 10.--CONSTRUCTION MATERIALS

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry means soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1-----Albany	Fair: wetness.	Poor: excess fines.	Unsuited	Poor: too sandy.
2-----Alpin	Good	Fair: excess fines.	Unsuited	Poor: too sandy.
3*. Aquic Quartzipsamments				
4*, 5*. Arents				
6*. Beaches				
7-----Blanton	Good	Fair: excess fines.	Unsuited	Poor: too sandy.
8-----Canaveral	Fair: wetness.	Good	Unsuited	Poor: too sandy.
9-----Cornelia	Good	Good	Unsuited	Poor: too sandy.
10-----Fripp	Good	Good	Unsuited	Poor: too sandy.
11-----Kershaw	Good	Fair: excess fines.	Unsuited	Poor: too sandy.
12*: Kershaw	Good	Fair: excess fines.	Unsuited	Poor: too sandy.
Urban land.				
13-----Kershaw	Good	Fair: excess fines.	Unsuited	Poor: too sandy.
14, 15-----Kureb	Good	Good	Unsuited	Poor: too sandy.
16-----Leon	Poor: wetness.	Fair: excess fines.	Unsuited	Poor: too sandy.
17*: Leon	Poor: wetness.	Fair: excess fines.	Unsuited	Poor: too sandy.
Urban land.				
18-----Lynn Haven	Poor: wetness.	Fair	Unsuited	Poor: too sandy, wetness.
19-----Mandarin	Fair: wetness.	Poor: thin layer.	Unsuited	Poor: too sandy.
20-----Mascotte	Good	Poor: excess fines.	Unsuited	Poor: too sandy.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
21*: Mascotte	Good	Poor: excess fines.	Unsuited	Poor: too sandy.
Urban land.				
22 Maurepas	Poor: low strength, excess humus, wetness.	Unsuited: excess humus.	Unsuited: excess humus.	Poor: wetness, excess humus.
23 Olustee	Good	Poor: excess fines.	Unsuited	Poor: too sandy.
24 Ortega	Good	Good	Unsuited	Poor: too sandy.
25 Pamlico	Poor: wetness, excess humus.	Poor: excess humus.	Unsuited	Poor: wetness.
26 Pelham	Poor: wetness.	Poor: excess fines.	Unsuited	Poor: wetness.
27*: Pelham	Poor: wetness.	Poor: excess fines.	Unsuited	Poor: wetness.
Urban land.				
28*. Pits				
29 Pottsburg	Fair: wetness.	Fair: excess fines.	Unsuited	Poor: too sandy.
30 Ridgeland	Fair: wetness.	Fair: excess fines.	Unsuited	Poor: too sandy.
31 Sapelo	Moderate: wetness.	Fair: excess fines.	Unsuited	Poor: too sandy, wetness.
32 Stockade	Poor: wetness.	Poor: excess fines.	Unsuited	Poor: wetness.
33 Surrency	Poor: wetness.	Poor: excess fines.	Unsuited	Poor: wetness.
34 Tisonia	Poor: wetness, shrink-swell, low strength.	Unsuited: excess fines, excess humus.	Unsuited	Poor: excess humus, excess salt, wetness.
35*. Urban land				
36 Wesconnett	Poor: wetness.	Fair: excess fines.	Unsuited	Poor: wetness, too sandy.
37 Yonges	Poor: wetness.	Unsuited	Unsuited	Poor: wetness.
38 Yulee	Poor: low strength, wetness.	Unsuited	Unsuited	Poor: wetness.

* See map unit description for the composition and behavior characteristics of the map unit.

TABLE 11.--WATER MANAGEMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
1-----Albany	Moderate: seepage.	Moderate: seepage.	Severe: slow refill.	Favorable------	Favorable------	Favorable.
2-----Alpin	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Not needed-----	Not needed-----	Not needed.
3*. Aquic Quartzipsamments						
4*, 5*. Arents						
6*. Beaches						
7-----Blanton	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Not needed-----	Not needed-----	Droughty.
8-----Canaveral	Severe: seepage.	Severe: seepage, piping, unstable fill.	Moderate: deep to water.	Cutbanks cave, wetness.	Not needed-----	Not needed.
9-----Cornelia	Severe: seepage.	Severe: seepage.	Severe: no water.	Not needed-----	Too sandy------	Droughty.
10-----Fripp	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Not needed-----	Too sandy------	Droughty.
11-----Kershaw	Severe: seepage.	Severe: seepage.	Severe: deep to water.	Not needed-----	Too sandy------	Droughty.
12*: Kershaw----------	Severe: seepage.	Severe: seepage.	Severe: deep to water.	Not needed-----	Too sandy------	Droughty.
Urban land.						
13-----Kershaw	Severe: seepage.	Severe: seepage.	Severe: deep to water.	Not needed-----	Too sandy------	Droughty.
14, 15-----Kureb	Severe: seepage.	Severe: seepage.	Severe: no water.	Not needed-----	Too sandy------	Droughty.
16-----Leon	Severe: seepage.	Severe: seepage, piping, erodes easily.	Moderate: deep to water.	Cutbanks cave, wetness.	Not needed-----	Not needed.
17*: Leon----------	Severe: seepage.	Severe: seepage, piping, erodes easily.	Moderate: deep to water.	Cutbanks cave, wetness.	Not needed-----	Not needed.
Urban land.						
18-----Lynn Haven	Severe: seepage.	Severe: seepage, piping, erodes easily.	Slight---------	Cutbanks cave, wetness.	Not needed-----	Not needed.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
19----------------- Mandarin	Severe: seepage.	Severe: seepage, piping.	Moderate: deep to water.	Favorable-------	Not needed------	Not needed.
20----------------- Mascotte	Moderate: seepage.	Moderate: seepage, unstable fill.	Moderate: deep to water.	Wetness, cutbanks cave.	Not needed------	Not needed.
21*:						
Mascotte----------	Moderate: seepage.	Moderate: seepage, unstable fill.	Moderate: deep to water.	Wetness, cutbanks cave.	Not needed------	Not needed.
Urban land.						
22----------------- Maurepas	Severe: seepage.	Severe: unstable fill, excess humus, low strength.	Slight----------	Floods, cutbanks cave.	Not needed------	Not needed.
23----------------- Olustee	Moderate: seepage.	Moderate: seepage, unstable fill.	Moderate: deep to water.	Wetness, cutbanks cave.	Not needed------	Not needed.
24----------------- Ortega	Severe: seepage.	Severe: seepage, piping.	Severe: deep to water.	Not needed------	Too sandy, soil blowing.	Not needed.
25----------------- Pamlico	Severe: seepage.	Severe: piping.	Slight----------	Floods, poor outlets.	Not needed------	Not needed.
26----------------- Pelham	Moderate: seepage.	Moderate: piping.	Slight: favorable.	Floods, wetness.	Not needed------	Not needed.
27*:						
Pelham------------	Moderate: seepage.	Moderate: piping.	Slight: favorable.	Floods, wetness.	Not needed------	Not needed.
Urban land.						
28*. Pits						
29----------------- Pottsburg	Severe: seepage.	Severe: seepage.	Moderate: deep to water.	Wetness, cutbanks cave.	Not needed------	Not needed.
30----------------- Ridgeland	Severe: seepage.	Severe: seepage, piping.	Moderate: deep to water, slow refill.	Wetness, cutbanks cave.	Not needed------	Droughty.
31----------------- Sapelo	Moderate: seepage.	Moderate: piping.	Slight----------	Wetness---------	Not needed------	Not needed.
32----------------- Stockade	Moderate: seepage.	Moderate: thin layer.	Slight----------	Wetness, floods.	Not needed------	Not needed.
33----------------- Surrency	Moderate: seepage.	Moderate: piping.	Favorable-------	Poor outlets, cutbanks cave, floods.	Not needed------	Not needed.
34----------------- Tisonia	Slight----------	Severe: wetness, excess salt.	Severe: salty water.	Percs slowly, floods, excess humus.	Not needed------	Not needed.
35*. Urban land						

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
36------------------ Wesconnett	Severe: seepage.	Severe: seepage, unstable fill, piping.	Slight----------	Wetness, cutbanks cave, poor outlets.	Not needed------	Not needed.
37------------------ Yonges	Moderate: seepage.	Moderate: piping.	Moderate: deep to water.	Wetness, floods, percs slowly.	Not needed------	Not needed.
38------------------ Yulee	Moderate: seepage.	Severe: wetness.	Slight----------	Floods, poor outlets.	Not needed------	Not needed.

* See map unit description for the composition and behavior characteristics of the map unit

TABLE 12.--RECREATIONAL DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1----------------------- Albany	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
2----------------------- Alpin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, soil blowing.	Severe: too sandy.
3*. Aquic Quartzipsamments				
4*, 5*. Arents				
6*. Beaches				
7----------------------- Blanton	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
8----------------------- Canaveral	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
9----------------------- Cornelia	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
10---------------------- Fripp	Severe: too sandy, floods.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
11---------------------- Kershaw	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
12*:				
Kershaw-----------------	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
Urban land.				
13---------------------- Kershaw	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
14---------------------- Kureb	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
15---------------------- Kureb	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
16---------------------- Leon	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.
17*:				
Leon--------------------	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.				
18---------------------- Lynn Haven	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
19: Mandarin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
20: Mascotte	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.
21*:				
Mascotte	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.				
22: Maurepas	Severe: floods, wetness, excess humus.	Severe: floods, wetness, excess humus.	Severe: floods, wetness, excess humus.	Severe: floods, wetness, excess humus.
23: Olustee	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.
24: Ortega	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
25: Pamlico	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.
26: Pelham	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
27*:				
Pelham	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.				
28*. Pits				
29: Pottsburg	Severe: too sandy.	Moderate: too sandy.	Severe: too sandy.	Moderate: too sandy.
30: Ridgeland	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy, wetness.	Severe: too sandy.
31: Sapelo	Severe: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.
32: Stockade	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
33: Surrency	Severe: wetness, floods	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
34: Tisonia	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
35*. Urban land				
36 Wesconnett	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
37 Yonges	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
38 Yulee	Severe: floods, wetness, too clayey.	Severe: floods, wetness, too clayey.	Severe: too clayey, wetness, floods.	Severe: wetness, too clayey, floods.

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 13.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
1-----Albany	Fair	Fair	Fair	Fair	Fair	---	Fair	Poor	Fair	Fair	Poor	---
2-----Alpin	Poor	Fair	Fair	Poor	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
3*. Aquic Quartzipsamments												
4*, 5*. Arents												
6*. Beaches												
7-----Blanton	Poor	Fair	Fair	Poor	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
8-----Canaveral	Poor	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
9-----Cornelia	Very poor.	Very poor.	Poor	Poor	Poor	---	Very poor.	Very poor.	Very poor.	Poor	Very poor.	---
10-----Fripp	Very poor.	Very poor.	Poor	Poor	Poor	---	Very poor.	Very poor.	Very poor.	Poor	Very poor.	---
11-----Kershaw	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---
12*:												
Kershaw-----	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---
Urban land.												
13-----Kershaw	Very poor.	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---
14, 15-----Kureb	Very poor.	Poor	Poor	Very poor.	Poor	---	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---
16-----Leon	Poor	Fair	Good	Poor	Fair	---	Fair	Poor	Fair	Fair	Poor	---
17*: Leon.												
Urban land.												
18-----Lynn Haven	Poor	Fair	Fair	Poor	Fair	---	Fair	Fair	Poor	Fair	Fair	---
19-----Mandarin	Very poor.	Poor	Poor	Poor	Fair	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
20-----Mascotte	Poor	Fair	Fair	Poor	Fair	---	Poor	Fair	Fair	Fair	Poor	---
21*:												
Mascotte-----	Poor	Fair	Fair	Poor	Fair	---	Poor	Fair	Fair	Fair	Poor	---

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
21*: Urban land.												
22---------------- Maurepas	Very poor.	Very poor.	Very poor.	Very poor.	---	---	Fair	Very poor.	Very poor.	Very poor.	Fair	---
23---------------- Olustee	Poor	Fair	Fair	Poor	Fair	---	Poor	Fair	Fair	Fair	Poor	---
24---------------- Ortega	Poor	Fair	Fair	Poor	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
25---------------- Pamlico	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good	---
26---------------- Pelham	Poor	Fair	Fair	Fair	Fair	---	Fair	Fair	Fair	Fair	Fair	---
27*: Pelham------------	Poor	Fair	Fair	Fair	Fair	---	Fair	Fair	Fair	Fair	Fair	---
Urban land.												
28*. Pits												
29---------------- Pottsburg	Very poor.	Poor	Poor	Poor	Fair	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
30---------------- Ridgeland	Poor	Poor	Poor	Fair	Fair	---	Poor	Poor	Poor	Fair	Poor	---
31---------------- Sapelo	Poor	Fair	Fair	Poor	Fair	---	Fair	Fair	Fair	Fair	Fair	---
32---------------- Stockade	Fair	Poor	Fair	Good	Good	---	Good	Good	Fair	Good	Good	---
33---------------- Surrency	Poor	Poor	Poor	Poor	Poor	---	Fair	Good	Poor	Poor	Fair	---
34---------------- Tisonia	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Poor	Poor	Very poor.	Very poor.	Poor	---
35*. Urban land												
36---------------- Wesconnett	Very poor.	Poor	Fair	Fair	Fair	---	Good	Good	Poor	Fair	Good	---
37---------------- Yonges	Very poor.	Very poor.	Very poor.	Fair	Fair	---	Good	Good	Very poor.	Poor	Good	---
38---------------- Yulee	Fair	Fair	Fair	Good	Good	---	Good	Good	Fair	Good	Good	---

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1------------------ Albany	0-50	Fine sand--------	SM	A-2-4	0	100	100	75-90	12-23	---	NP
	50-88	Sandy clay loam, fine sandy loam.	SC, SM, SM-SC	A-2, A-4, A-6	0	97-100	95-100	70-100	25-50	<40	NP-20
2------------------ Alpin	0-5	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	5-48	Fine sand--------	SP-SM	A-3, A-2-4	0	95-100	90-100	60-100	5-12	---	NP
	48-80	Fine sand--------	SP-SM, SM	A-2-4, A-3	0	95-100	90-100	60-100	8-20	---	NP
3*. Aquic Quartzipsamments											
4*, 5*. Arents											
6*. Beaches											
7------------------ Blanton	0-54	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	54-80	Sandy clay loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2-4	0	100	100	85-100	24-50	<30	NP-10
8------------------ Canaveral	0-17	Fine sand--------	SP	A-3	0	100	100	90-100	1-4	---	NP
	17-80	Fine sand, sand-	SP	A-3	0	70-100	70-95	65-90	1-3	---	NP
9------------------ Cornelia	0-39	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	39-92	Fine sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	3-15	---	NP
10----------------- Fripp	0-80	Fine sand--------	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
11----------------- Kershaw	0-80	Fine sand--------	SP, SP-SM	A-2, A-3	0	98-100	98-100	90-100	1-7	---	NP
12*: Kershaw-----------	0-80	Fine sand--------	SP, SP-SM	A-2, A-3	0	98-100	98-100	90-100	1-7	---	NP
Urban land.											
13----------------- Kershaw	0-80	Fine sand--------	SP, SP-SM	A-2, A-3	0	98-100	98-100	90-100	1-7	---	NP
14, 15------------- Kureb	0-80	Fine sand--------	SP	A-3	0	100	100	90-100	0-5	---	NP
16----------------- Leon	0-18	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	18-80	Fine sand.	SM, SP-SM, SP	A-3, A-2-4	0	100	100	80-100	3-20	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
17*: Leon	0-18	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	18-80	Fine sand	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
Urban land.											
18 Lynn Haven	0-21	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	21-80	Sand, fine sand	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
19 Mandarin	0-26	Fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	26-40	Fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	40-73	Fine sand	SP, SP-SM	A-3	0	100	100	90-100	1-7	---	NP
	73-80	Fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	3-12	---	NP
20 Mascotte	0-15	Fine sand	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	15-28	Fine sand, sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-15	---	NP
	28-58	Sandy clay loam, fine sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	85-100	19-45	<38	NP-15
21*: Mascotte	0-15	Fine sand	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
	15-28	Fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	8-15	---	NP
	28-58	Sandy clay loam, fine sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	85-100	19-45	<38	NP-15
Urban land.											
22 Maurepas	0-80	Muck	Pt	A-8	0	---	---	---	---	---	---
23 Olustee	0-6	Fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	75-100	5-15	---	NP
	6-21	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	75-100	8-15	---	NP
	21-36	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	75-100	5-15	---	NP
	36-54	Sandy clay loam, fine sandy loam.	SC	A-2, A-4, A-6	0	100	100	85-100	30-45	25-38	8-15
24 Ortega	0-82	Fine sand	SP, SP-SM	A-3	0	90-100	90-100	60-100	2-8	---	NP
25 Pamlico	0-38	Muck	Pt	A-8	0	---	---	---	---	---	---
	38-60	Loamy sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	70-95	5-20	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
26------------------ Pelham	0-21	Loamy fine sand-	SM	A-2-4	0	100	95-100	75-90	15-30	---	NP
	21-69	Sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	65-90	30-50	<35	2-15
27*:											
Pelham-------------	0-21	Loamy fine sand-	SM	A-2-4	0	100	95-100	75-90	15-30	---	NP
	21-69	Sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	95-100	65-90	30-50	<35	2-15
Urban land.											
28*. Pits											
29------------------ Pottsburg	0-57	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	4-12	---	NP
	57-80	Fine sand.	SP-SM, SP	A-3, A-2-4	0	100	100	90-100	4-12	---	NP
30------------------ Ridgeland	0-6	Fine sand--------	SP-SM, SM	A-2-4, A-3	0	100	100	80-100	5-20	---	NP
	6-16	Fine sand--------	SP-SM, SP, SM	A-2-4, A-3	0	100	100	80-100	5-18	---	NP
	16-31	Fine sand--------	SP-SM, SP, SM	A-2-4, A-3	0	100	100	80-100	2-15	---	NP
	31-80	Fine sand--------	SP-SM, SM	A-2-4, A-3	0	100	90-100	70-100	5-15	---	NP
31------------------ Sapelo	0-23	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	100	100	90-100	4-15	---	NP
	23-38	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	100	100	95-100	8-20	---	NP
	38-56	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	100	100	90-100	4-15	---	NP
	56-80	Fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	90-100	20-50	20-40	3-20
32------------------ Stockade	0-12	Fine sandy loam-	SM, SM-SC	A-2-4	0	100	100	90-100	20-35	<30	NP-7
	12-46	Sandy clay loam, fine sandy loam.	SC	A-2, A-4, A-6	0	100	100	90-100	28-45	28-40	9-18
	46-65	Fine sand, loamy fine sand.	SP, SP-SM, SM	A-2,4, A-3	0	100	100	90-100	2-15	---	NP
33------------------ Surrency	0-14	Loamy fine sand	SM	A-2-4	0	100	95-100	90-100	15-26	---	NP
	14-26	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4	0	100	95-100	90-100	11-26	---	NP
	26-70	Fine sandy loam, sandy clay loam.	SM, SM-SC	A-2-4	0	100	95-100	90-100	22-33	<28	NP-7
	70-80	Sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-6, A-4	0	100	95-100	90-100	30-44	<34	NP-21

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
34----------------- Tisonia	0-18	Mucky peat-------	Pt	A-8	0	---	---	---	---	---	---
	18-65	Clay-------------	CH	A-7	0	100	100	95-100	90-100	80-95	50-60
35*. Urban land											
36----------------- Wesconnett	0-2	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	2-32	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
	32-44	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	90-100	5-12	---	NP
	44-80	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-15	---	NP
37----------------- Yonges	0-6	Fine sandy loam	SM-SC, SM	A-2, A-4	0	100	100	90-100	25-49	<30	NP-7
	6-65	Sandy clay loam	CL, SC	A-4, A-6, A-7	0	100	100	95-100	40-55	25-45	8-25
	65-80	Fine sandy loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	100	80-100	36-65	20-40	8-22
38----------------- Yulee	0-14	Clay-------------	CL, CH	A-7	0	100	100	95-100	55-80	44-55	22-30
	14-66	Sandy clay loam	SC, CL	A-6, A-7	0	100	100	95-100	40-60	30-43	11-21
	66-82	Sandy clay loam, clay loam.	CL	A-6, A-7	0	100	100	95-100	52-80	32-48	13-25

* See map unit description for the composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T	Wind erodibility group
	In	In/hr	In/in	pH	Mmhos/cm						
1------------------ Albany	0-50	6.0-20	0.03-0.07	4.5-6.5	<2	Low--------	Moderate	High------	0.17	5	---
	50-88	0.6-2.0	0.10-0.16	4.5-6.0	<2	Low--------	High------	High------	0.24		
2------------------ Alpin	0-5	>20	0.05-0.10	4.5-5.5	<2	Very low	Low-------	High------	0.10	5	2
	5-48	>20	0.03-0.07	4.5-5.5	<2	Very low	Low-------	High------	0.10		
	48-80	>20	0.06-0.09	4.5-5.5	<2	Very low	Low-------	High------	0.10		
3*. Aquic Quartzipsamments											
4*, 5*. Arents											
6*. Beaches											
7------------------ Blanton	0-54	6.0-20	0.03-0.07	4.5-6.0	<2	Very low	Low-------	High------	0.17	5	2
	54-80	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low--------	High------	High------	0.32		
8------------------ Canaveral	0-17	>20	0.02-0.05	6.6-8.4	<2	Very low	Moderate	Low-------	0.15	5	2
	17-80	>20	0.02-0.05	6.6-8.4	<2	Very low	Moderate	Low-------	0.15		
9------------------ Cornelia	0-39	6.0-20	0.02-0.05	3.6-5.5	<2	Low--------	Low-------	High------	0.10	5	2
	39-92	0.6-2.0	0.05-0.10	3.6-5.5	<2	Low--------	Low-------	High------	0.17		
10----------------- Fripp	0-6	6.0-20	0.02-0.08	5.1-7.8	<2	Low--------	Low-------	Low-------	0.10	5	---
	6-80	6.0-20	0.02-0.06	5.6-7.8	<2	Low--------	Low-------	Low-------	0.10		
11----------------- Kershaw	0-80	>20	0.02-0.05	4.5-6.0	<2	Very low	Low-------	High------	0.15	5	---
12*: Kershaw-----------	0-80	>20	0.02-0.05	4.5-6.0	<2	Very low	Low-------	High------	0.15	5	---
Urban land.											
13----------------- Kershaw	0-80	>20	0.02-0.05	4.5-6.0	<2	Very low	Low-------	High------	0.15	5	---
14, 15------------- Kureb	0-80	6.0-20	<0.05	4.5-6.5	<2	Low--------	Low-------	Low-------	0.17	4	---
16----------------- Leon	0-18	6.0-20	0.03-0.07	3.6-5.5	<2	Very low	High------	High------	0.20	5	---
	18-80	0.6-6.0	0.10-0.15	3.6-5.5	<2	Very low	High------	High------	0.20		
17*: Leon--------------	0-18	6.0-20	0.03-0.07	3.6-5.5	<2	Very low	High------	High------	0.20	5	---
	18-80	0.6-6.0	0.10-0.15	3.6-5.5	<2	Very low	High------	High------	0.20		
Urban land.											
18----------------- Lynn Haven	0-21	6.0-20	0.03-0.07	3.6-5.5	<2	Very low	High------	High------	0.20	5	---
	21-80	0.6-6.0	0.10-0.15	3.6-5.5	<2	Very low	High------	High------	0.20		
19----------------- Mandarin	0-26	6.0-20	0.03-0.07	3.6-6.0	<2	Low--------	Low-------	High------	0.15	5	2
	26-40	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low--------	Moderate	High------	0.20		
	40-73	6.0-20	0.03-0.07	5.6-7.3	<2	Low--------	Moderate	Moderate	0.15		
	73-80	0.6-2.0	0.10-0.15	5.6-7.3	<2	Low--------	Moderate	Moderate	0.15		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors		Wind erodibility group
							Uncoated steel	Concrete	K	T	
	In	In/hr	In/in	pH	Mmhos/cm						
20	0-15	6.0-20	0.03-0.08	3.6-5.5	<2	Very low	High	High	0.20	5	---
Mascotte	15-28	0.6-2.0	0.10-0.15	3.6-5.5	<2	Very low	High	High	0.20		
	28-58	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low	High	High	0.32		
21*:											
Mascotte	0-15	6.0-20	0.03-0.08	3.6-5.5	<2	Very low	High	High	0.20	5	---
	15-28	0.6-2.0	0.10-0.15	3.6-5.5	<2	Very low	High	High	0.20		
	28-58	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low	High	High	0.32		
Urban land.											
22	0-80	2.0-6.0	>0.20	5.6-8.4	2-4	Low	High	Moderate	---	---	---
Maurepas											
23	0-6	6.0-20	0.05-0.10	3.6-5.5	<2	Very low	High	High	0.20	5	---
Olustee	6-21	0.6-2.0	0.10-0.15	3.6-5.5	<2	Very low	High	High	0.20		
	21-36	6.0-20	0.03-0.08	4.5-5.5	<2	Very low	High	High	0.20		
	36-54	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low	High	High	0.32		
24	0-82	>20	0.03-0.08	4.5-6.5	<2	Very low	Low	High	0.15	5	2
Ortega											
25	0-38	2.0-6.0	0.24-0.26	3.6-4.4	<2	---------	High	High	---	---	---
Pamlico	38-60	6.0-20	0.03-0.06	3.6-5.5	<2	Low	High	High	---		
26	0-21	6.0-20	0.05-0.08	4.5-5.5	<2	Very low	High	High	0.10	5	---
Pelham	21-60	0.6-2.0	0.10-0.13	4.5-5.5	<2	Low	High	High	0.24		
	60-69	0.6-2.0	0.10-0.16	4.5-5.5	<2	Low	High	High	0.24		
27*:											
Pelham	0-21	6.0-20	0.05-0.08	4.5-5.5	<2	Very low	High	High	0.10	5	---
	21-60	0.6-2.0	0.10-0.13	4.5-5.5	<2	Low	High	High	0.24		
	60-69	0.6-2.0	0.10-0.16	4.5-5.5	<2	Low	High	High	0.24		
Urban land.											
28*.											
Pits											
29	0-57	6.0-20	0.03-0.07	4.5-6.5	<2	Very low	High	High	0.15	5	2
Pottsburg	57-80	0.6-2.0	0.07-0.10	4.5-6.0	<2	Very low	High	High	0.20		
30	0-6	6.0-20	0.05-0.10	3.6-6.5	<2	Low	Moderate	High	0.15	5	---
Ridgeland	6-16	0.6-6.0	0.04-0.08	3.6-6.5	<2	Low	Moderate	High	0.15		
	16-31	6.0-20	0.04-0.08	3.6-6.5	<2	Low	Moderate	High	0.15		
	31-80	0.6-6.0	0.04-0.08	3.6-6.5	<2	Low	Moderate	High	0.15		
31	0-23	6.0-20	0.03-0.07	3.6-6.5	<2	Low	High	High	0.17	5	---
Sapelo	23-38	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low	High	High	0.15		
	38-56	6.0-20	0.03-0.07	3.6-5.5	<2	Low	High	High	0.17		
	56-80	0.6-2.0	0.12-0.17	3.6-5.5	<2	Low	High	High	0.24		
32	0-12	2.0-6.0	0.15-0.20	5.1-6.5	<2	Low	High	Moderate	0.20	5	---
Stockade	12-46	0.6-6.0	0.12-0.17	5.6-7.3	<2	Low	High	Moderate	0.28		
	46-65	6.0-20	0.05-0.08	5.6-7.3	<2	Low	High	Moderate	0.17		
33	0-26	6.0-20	0.05-0.08	3.6-5.0	<2	Low	High	High	0.10	5	---
Surrency	26-70	0.6-2.0	0.11-0.15	3.6-5.5	<2	Low	High	High	0.15		
	70-80	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low	High	High	0.15		
34	0-18	6.0-20	0.25-0.35	6.1-7.8	>16	Low	High	High	---	---	---
Tisonia	18-65	<0.06	0.15-0.20	6.1-7.8	>16	High	High	High	---		
35*.											
Urban land											

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T	Wind erodi-bility group
	In	In/hr	In/in	pH	Mmhos/cm						
36: Wesconnett	0-2	6.0-20	0.10-0.15	3.6-6.5	<2	Low	Moderate	High	0.20	5	---
	2-32	0.6-6.0	0.10-0.15	3.6-6.5	<2	Low	Moderate	High	0.20		
	32-44	6.0-20	0.05-0.08	3.6-6.5	<2	Low	Moderate	High	0.20		
	44-80	0.6-6.0	0.10-0.15	3.6-6.5	<2	Low	Moderate	High	0.20		
37: Yonges	0-6	0.6-6.0	0.09-0.14	5.1-7.8	<2	Low	High	Moderate	0.15	5	---
	6-65	0.2-0.6	0.13-0.18	6.1-8.4	<2	Low	High	Moderate	0.17		
	65-80	0.6-2.0	0.12-0.16	6.1-8.4	<2	Low	High	Moderate	0.20		
38: Yulee	0-14	0.2-0.6	0.15-0.20	5.1-7.8	<2	Moderate	High	Moderate	0.28	5	---
	14-66	0.6-2.0	0.12-0.17	5.6-8.4	<2	Low	High	Moderate	0.32		
	66-82	0.6-2.0	0.12-0.17	5.6-8.4	<2	Low	High	Moderate	0.32		

* See map unit description for the composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Subsidence	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Initial	Total
					Ft			In		In	In
1------------------ Albany	C	Rare---------	---	---	1.0-2.5	Apparent	Dec-Mar	>60	---	---	---
2------------------ Alpin	A	None---------	---	---	>60	---	---	>60	---	---	---
3*. Aquic Quartzipsamments											
4*, 5*. Arents											
6*. Beaches											
7------------------ Blanton	A	None---------	---	---	3.5-5.0	Perched	Aug-Dec	>60	---	---	---
8------------------ Canaveral	C	None---------	---	---	1.0-3.0	Apparent	Jun-Nov	>60	---	---	---
9------------------ Cornelia	A	None---------	---	---	>6.0	---	---	>60	---	---	---
10----------------- Fripp	A	Rare---------	---	---	>6.0	---	---	>60	---	---	---
11----------------- Kershaw	A	None---------	---	---	>6.0	---	---	>60	---	---	---
12*: Kershaw-----------	A	None---------	---	---	>6.0	---	---	>60	---	---	---
Urban land.											
13----------------- Kershaw	A	None---------	---	---	>6.0	---	---	>60	---	---	---
14, 15------------- Kureb	A	None---------	---	---	>6.0	---	---	>60	---	---	---
16----------------- Leon	A/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---
17*: Leon--------------	A/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---
Urban land.											
18----------------- Lynn Haven	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---
19----------------- Mandarin	A/D	None---------	---	---	1.5-3.5	Apparent	Jun-Dec	>60	---	---	---
20----------------- Mascotte	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---
21*: Mascotte----------	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---
Urban land.											

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Subsidence	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Initial	Total
					Ft			In		In	In
22----------------- Maurepas	D	Common-------	Brief to long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	>60	---	---	>51
23----------------- Olustee	B/D	None---------	---	---	0-1.0	Apparent	Jun-Feb	>60	---	---	---
24----------------- Ortega	A	None---------	---	---	3.5-5.0	Apparent	Jun-Feb	>60	---	---	---
25----------------- Pamlico	D	Frequent-----	Very long	Jun-Apr	+1-1.0	Apparent	Jun-May	>60	---	4-12	10-36
26----------------- Pelham	B/D	Common-------	Brief------	Dec-Mar	0-1.0	Apparent	Jun-May	>60	---	---	---
27*:											
Pelham-------------	B/D	Common-------	Brief------	Dec-Mar	0-1.0	Apparent	Jun-May	>60	---	---	---
Urban land.											
28*. Pits											
29----------------- Pottsburg	A/D	None---------	---	---	0.5-1.0	Apparent	Jul-Oct	>60	---	---	---
30----------------- Ridgeland	D	None---------	---	---	1.0-1.5	Apparent	Jul-Oct	>60	---	---	---
31----------------- Sapelo	D	None---------	---	---	0-1.0	Apparent	Jun-Dec	>60	---	---	---
32----------------- Stockade	B/D	Frequent-----	Long	Jun-Mar	+2-1.0	Apparent	Jun-Mar	>60	---	---	---
33----------------- Surrency	D	Common-------	Very long	Jul-Mar	+1-1.0	Apparent	Jun-May	>60	---	---	---
34----------------- Tisonia	D	Frequent-----	Very long	Jan-Dec	+2-0	Apparent	Jan-Dec	>60	---	16-18	16-25
35*. Urban land											
36----------------- Wesconnett	D	Common-------	Very long	Jun-Apr	+1-1.0	Apparent	Jun-Apr	>60	---	---	---
37----------------- Yonges	D	Common-------	Long-------	Jun-Mar	0-1.0	Apparent	Jun-Dec	>60	---	---	---
38----------------- Yulee	D	Frequent-----	Long-------	Jun-Mar	+1-0	Apparent	Jun-Mar	>60	---	---	---

* See map unit description for composition and behavior characteristics of the map unit.

TABLE 17.--DEPTH TO WATER TABLE IN SELECTED SOILS

Soil series	Elevation above MSL	Year	*Month January	February	March	April	May	June	July	August	September	October	November	December
	Ft		In	In	In	In	In	In	In	In	In	In	In	In
Albany	18	1974	51	59	60	47	59	58	32	13	7	28	52	60
		1975	56	49	48	48	51	58	38	2	11	8	22	36
		Mean	54	54	54	48	55	58	35	8	9	18	37	48
Blanton	12	1974	62	60	60	60	60	60	60	50	52	56	60	60
		1975	60	64	72	58	68	75	63	50	56	44	43	54
		Mean	61	62	66	59	64	68	62	50	54	50	52	57
Leon	22	1974	17	28	32	24	32	24	14	2	13	11	26	31
		1975	23	13	19	48	20	26	10	8	3	9	20	26
		Mean	20	21	25	16	26	25	12	5	8	10	23	28
Mandarin	15	1974	38	53	57	43	48	37	31	12	15	30	48	52
		1975	48	42	46	39	50	53	32	24	39	20	32	48
		Mean	43	48	52	41	49	45	32	18	27	25	40	50
Orgega	30	1974	54	60	64	60	60	55	53	49	28	42	54	58
		1975	58	58	57	50	48	45	37	32	30	30	34	46
		Mean	56	59	61	55	54	50	45	40	29	36	44	52
Pelham**	25	1974	7	21	25	4	21	22	+1	+2	+2	4	24	30
		1975	17	2	8	0	13	12	+1	+3	0	+2	+2	5
		Mean	12	11	17	2	17	17	+1	+3	+1	1	11	17
Pottsburg	16	1974	28	34	38	30	39	37	21	8	9	4	24	30
		1975	30	22	22	14	15	27	11	14	7	10	18	32
		Mean	29	28	30	22	27	32	16	11	8	7	21	31
Ridgeland	13	1974	23	31	36	24	37	31	24	20	20	21	35	37
		1975	30	19	24	17	33	36	18	17	9	18	27	33
		Mean	27	25	30	21	35	33	21	18	15	19	31	35

*Monthly readings based on the average of two readings taken on the first and middle of the month.
**A "plus" symbol (+) indicates that the water table is above the surface.

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm): Sand: Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Hydr. cond. (sat.)	Bulk density field moist	Water content: 1/10 bar	1/3 bar	15 bar
	In										Cm/hr	G/cc	Pct (wt)		
Albany:															
S16-10-1	0-3	A1	0.0	0.1	0.3	68.1	21.4	89.9	7.3	2.8	---	---	---	---	---
S16-10-2	3-15	A21	0.0	0.0	0.2	69.3	22.3	91.8	5.7	2.5	---	---	---	---	---
S16-10-3	15-29	A21	0.0	0.0	0.2	69.7	22.1	92.0	5.4	2.6	---	---	---	---	---
S16-10-4	29-39	A22	0.0	0.0	0.3	75.7	17.5	93.5	4.6	1.9	---	---	---	---	---
S16-10-5	39-50	A22	0.0	0.0	0.2	75.0	17.7	92.9	4.8	2.3	---	---	---	---	---
S16-10-6	50-63	B21t	0.0	0.1	0.2	59.9	15.0	75.2	5.1	19.7	---	---	---	---	---
S16-10-7	63-88	B22tg	0.0	0.1	0.4	39.3	21.0	60.8	7.5	31.7	---	---	---	---	---
Alpin:															
S16-20-1	0-5	A1	0.0	0.0	0.9	41.6	50.1	92.6	6.0	1.4	78.2	1.24	8.85	5.61	2.16
S16-20-2	5-11	A21	0.0	0.0	0.7	62.8	32.0	95.5	3.2	1.3	32.9	1.35	7.61	4.24	1.44
S16-20-3	11-30	A22	0.0	0.0	0.8	78.4	17.0	96.2	2.7	1.1	42.7	1.31	5.99	3.32	0.99
S16-20-4	30-48	A23	0.0	0.0	0.9	82.5	12.6	96.0	2.9	1.1	36.8	1.36	5.11	2.71	0.74
S16-20-5	48-72	A2&B1	0.0	0.0	1.2	82.3	12.4	95.9	3.3	0.8	25.3	1.40	5.73	3.28	0.94
S16-20-6	72-80	A2&B1	0.0	0.1	1.0	81.1	12.4	94.6	3.0	2.4	20.7	1.45	9.52	5.35	2.40
Blanton:															
S16-14-1	0-3	A1	0.0	0.0	1.9	81.8	5.1	88.8	8.6	2.6	---	---	---	---	---
S16-14-2	3-9	A21	0.0	0.0	2.2	83.1	4.8	90.1	6.6	3.3	---	---	---	---	---
S16-14-3	9-21	A22	0.0	0.0	2.2	83.7	5.1	91.0	6.4	2.6	---	---	---	---	---
S16-14-4	21-36	A23	0.0	0.1	2.2	87.0	4.8	94.1	4.2	1.7	---	---	---	---	---
S16-14-5	36-54	A24	0.0	0.1	2.4	85.2	5.4	93.1	4.0	2.9	---	---	---	---	---
S16-14-6	54-65	B21t	0.0	0.2	1.7	69.9	3.0	74.8	5.6	19.6	---	---	---	---	---
S16-14-7	65-80	B22t	0.0	0.8	4.0	68.7	3.3	76.8	4.0	19.2	---	---	---	---	---
Cornelia:															
S16-24-1	0-7	A1	0.0	0.1	2.4	84.8	3.4	90.7	6.4	2.9	60.5	0.97	27.65	14.88	5.27
S16-24-2	7-13	A21	0.0	0.1	2.6	90.5	3.2	96.4	2.4	1.2	47.3	1.29	6.50	3.99	2.31
S16-24-3	13-39	A22	0.0	0.1	2.6	91.9	3.3	97.9	1.5	0.6	45.7	1.41	3.59	2.19	1.03
S16-21-4	39-44	B21h	0.0	0.1	2.4	81.0	3.3	86.8	3.3	9.9	33.9	1.21	15.49	12.04	2.85
S16-24-5	44-53	B22h	0.0	0.1	2.1	88.1	3.0	93.3	2.3	4.4	46.7	1.37	9.25	7.07	2.81
S16-24-6	53-73	B23h	0.0	0.1	2.4	90.4	3.1	96.0	1.4	2.6	46.3	1.42	6.77	4.75	1.73
S16-24-7	73-92	B24h	0.0	0.1	2.4	91.4	3.2	97.1	1.2	1.7	56.5	1.36	6.99	4.71	1.67
S16-24-8	92-106	B25h	0.0	0.1	2.2	92.2	2.7	97.2	1.4	1.4	59.8	1.42	6.10	4.37	1.09
Fripp:															
S16-19-1	0-6	A1	0.0	0.1	3.3	88.9	5.4	97.7	2.1	0.2	91.4	1.11	9.21	6.66	3.46
S16-19-2	6-30	C1	0.0	0.0	0.8	95.0	1.3	97.1	2.9	0.0	57.2	1.37	3.73	3.22	1.59
S16-19-3	30-54	C2	0.0	0.0	1.0	94.9	2.5	98.4	1.6	0.0	91.4	1.38	3.12	2.66	1.28
S16-19-4	54-78	C3	0.0	0.0	0.5	88.1	11.0	99.6	0.4	0.0	44.7	1.49	3.17	2.67	1.31
S16-19-5	78-90	C4	0.0	0.0	1.0	83.4	15.2	99.6	0.4	0.0	---	---	---	---	---
Kershaw:															
S16-7-1	0-3	A1	0.0	0.0	1.0	92.1	3.0	96.1	1.7	2.2	---	---	---	---	---
S16-7-2	3-25	C1	0.0	0.0	0.8	93.0	3.1	96.9	1.2	1.9	55.9	1.51	4.04	2.34	0.84
S16-7-3	25-51	C1	0.0	0.0	0.9	93.7	2.9	97.5	0.5	2.0	62.9	1.52	3.59	2.05	0.78
S16-7-4	51-80	C2	0.0	0.0	0.9	93.4	3.1	97.4	0.5	2.1	51.1	1.50	3.71	2.29	0.92
Kureb:															
S16-4-1	0-4	A1	0.0	0.0	5.0	88.9	2.0	96.1	2.2	1.7	44.7	1.27	9.83	7.29	2.85
S16-4-3	16-38	C&Bh	0.0	0.3	5.5	91.7	2.0	99.5	0.2	0.3	50.0	1.47	3.33	1.87	0.38
S16-4-4	38-60	C&Bh	0.0	1.0	12.1	85.0	1.1	99.2	0.0	0.8	70.3	1.46	5.25	3.82	0.40
S16-4-5	60-82	C	0.0	0.5	8.7	89.2	1.1	99.5	0.0	0.5	85.5	1.46	3.05	1.59	0.33

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm): Sand: Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Hydr. cond. (sat.)	Bulk density field moist	Water content: 1/10 bar	1/3 bar	15 bar
	In										Cm/hr	G/cc	------Pct (wt)------		
Leon:															
S16-9-1	0-5	A11	0.0	0.0	1.5	86.7	3.5	91.7	5.1	3.2	---	---	---	---	---
S16-9-2	5-8	A12	0.0	0.1	1.5	90.6	3.6	95.8	2.3	1.9	---	---	---	---	---
S16-9-3	8-18	A2	0.0	0.0	1.8	93.1	2.7	97.6	1.6	0.8	---	---	---	---	---
S16-9-4	18-26	B21h	0.0	0.0	1.2	88.8	3.3	93.3	3.2	3.5	---	---	---	---	---
S16-9-5	26-37	B22h	0.0	0.0	1.1	91.6	3.8	96.5	1.6	1.9	---	---	---	---	---
S16-9-6	37-45	B3	0.0	0.0	1.3	92.2	2.9	96.4	1.9	1.7	---	---	---	---	---
S16-9-7	45-80	B'2h	0.0	0.0	0.8	92.0	3.4	96.2	1.4	2.4	---	---	---	---	---
Lynn Haven:															
S16-23-1	0-7	A11	0.1	0.6	6.5	78.0	4.1	89.3	9.6	1.1	---	---	---	---	---
S16-23-2	7-13	A12	0.1	0.5	7.4	84.2	3.5	95.7	3.3	1.0	---	---	---	---	---
S16-23-3	13-21	A2	0.1	0.6	6.9	85.1	4.1	96.8	2.4	0.8	---	---	---	---	---
S16-23-4	21-35	B21h	0.0	0.6	7.2	77.1	3.7	88.6	5.8	5.6	---	---	---	---	---
S16-23-5	35-48	B22h	0.0	0.6	7.0	80.1	2.6	90.3	4.4	5.3	---	---	---	---	---
S16-23-6	48-62	B31	0.0	0.2	5.1	85.5	1.3	92.1	2.3	5.6	---	---	---	---	---
S16-23-7	62-80	B32	0.0	0.3	6.5	85.3	1.3	93.4	1.8	4.8	---	---	---	---	---
Mandarin:															
S16-13-1	0-4	A1	0.0	0.0	1.0	91.5	1.4	93.9	4.6	1.5	---	---	---	---	---
S16-13-2	4-8	A21	0.0	0.0	1.4	97.3	0.6	99.3	0.2	0.5	---	---	---	---	---
S16-13-3	8-26	A22	0.0	0.0	1.0	95.7	1.4	98.1	1.5	0.4	---	---	---	---	---
S16-13-4	26-30	B21h	0.0	0.0	0.9	88.9	1.3	91.1	4.8	4.1	---	---	---	---	---
S16-13-5	30-35	B22h	0.0	0.1	1.5	88.7	1.0	91.3	3.2	5.5	---	---	---	---	---
S16-13-6	35-40	B23h	0.0	0.0	1.0	87.7	1.0	89.7	4.0	6.3	---	---	---	---	---
S16-13-7	40-46	B3	0.0	0.0	1.0	95.0	1.1	97.1	0.9	2.0	---	---	---	---	---
S16-13-8	46-56	A'21	0.0	0.0	0.4	97.4	1.4	99.2	0.4	0.4	---	---	---	---	---
S16-13-9	56-62	A'22	0.0	0.0	0.4	96.9	1.8	99.1	0.5	0.4	---	---	---	---	---
S16-13-10	62-73	A'23	0.0	0.0	0.5	96.3	2.0	98.8	0.3	0.9	---	---	---	---	---
S16-13-11	73-80	B'2h	0.0	0.0	1.7	93.7	1.4	96.8	1.5	1.7	---	---	---	---	---
Mascotte:															
S16-8-1	0-5	A1	0.0	0.2	2.7	77.7	10.0	90.5	2.5	7.0	---	---	---	---	---
S16-8-2	5-8	A21	0.0	0.1	2.1	79.9	11.2	93.3	4.0	2.7	---	---	---	---	---
S16-8-3	8-15	A22	0.0	0.1	2.2	81.2	11.0	94.5	3.8	1.7	---	---	---	---	---
S16-8-4	15-21	B21h	0.0	0.1	1.9	72.7	10.1	84.8	5.9	9.3	---	---	---	---	---
S16-8-5	21-23	B22h	0.0	0.1	1.8	70.6	10.2	82.7	6.5	10.8	---	---	---	---	---
S16-8-6	23-25	B23h	0.0	0.1	1.8	75.7	10.0	87.6	4.9	7.5	---	---	---	---	---
S16-8-7	25-28	A'2&B3	0.0	0.1	1.8	76.0	11.2	89.1	3.3	7.6	---	---	---	---	---
S16-8-8	28-46	B'21tg	0.0	0.1	1.1	59.2	12.3	72.7	3.5	23.8	---	---	---	---	---
S16-8-9	46-58	B'22tg	0.0	0.0	1.4	74.4	8.2	84.0	0.8	15.2	---	---	---	---	---
S16-8-10	58-80	Cg	0.0	0.0	1.6	81.8	8.7	92.1	0.2	7.7	---	---	---	---	---
Olustee:															
S16-22-1	0-6	A1	0.0	0.2	1.1	76.6	10.4	88.3	9.2	2.5	60.8	1.13	18.13	14.46	3.71
S16-22-2	6-11	B21h	0.0	0.1	1.0	80.1	10.9	92.1	5.6	2.3	9.9	1.38	14.15	10.07	2.14
S16-22-3	11-21	B22h	0.0	0.1	1.0	76.8	10.9	88.8	6.4	4.8	9.2	1.46	13.75	9.54	1.84
S16-22-4	21-36	A'2	0.0	0.1	1.1	81.1	10.4	92.7	4.6	2.7	3.9	1.47	17.49	12.31	2.53
S16-22-5	36-54	B'2tg	0.0	0.2	0.9	63.1	7.7	71.9	5.3	22.8	1.8	1.60	22.03	13.70	3.31
S16-22-6	54-64	C1g	0.0	0.1	2.4	89.7	1.1	93.3	3.1	3.6	0.3	1.63	22.03	21.11	7.85
S16-22-7	64-80	C2g	0.0	0.1	0.8	84.2	5.4	90.5	1.7	7.8	0.7	1.71	20.55	16.97	5.10

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm): Sand: Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Hydr. cond. (sat.)	Bulk density field moist	Water content: 1/10 bar	1/3 bar	15 bar
	In										Cm/hr	G/cc	Pct (wt)		
Ortega:															
S16-3-1	0-5	A1	0.0	0.0	1.0	91.4	3.2	95.6	2.3	2.1	50.9	1.20	8.52	5.35	2.15
S16-3-2	5-33	C1	0.0	0.0	0.9	92.2	3.5	96.6	1.2	2.2	38.4	1.37	5.06	2.85	0.80
S16-3-3	33-48	C2	0.0	0.0	0.9	93.7	3.1	97.7	0.3	2.0	54.8	1.38	4.94	2.90	0.64
S16-3-4	48-63	C3	0.0	0.0	0.9	95.2	2.7	98.8	0.6	0.6	51.3	1.41	3.30	2.08	0.73
S16-3-5	63-82	C4	0.0	0.0	0.8	95.6	2.9	99.3	0.4	0.3	54.2	1.43	3.07	2.75	1.28
Pelham:															
S16-18-1	0-6	Ap	0.0	0.1	0.6	61.9	19.4	82.0	15.5	2.5	25.2	1.16	22.57	17.62	3.95
S16-18-2	6-14	A21	0.0	0.1	0.4	65.6	22.3	88.4	8.4	3.2	8.8	1.42	11.84	7.67	1.44
S16-18-3	14-21	A22	0.0	0.1	0.4	68.0	21.5	90.0	7.0	3.0	6.9	1.47	10.69	7.22	1.53
S16-18-4	21-26	B21tg	0.0	0.0	0.4	60.0	18.7	79.1	7.8	13.1	0.8	1.57	19.22	16.43	7.31
S16-18-5	26-44	B22tg	0.0	0.1	0.3	49.4	15.7	65.5	7.0	27.5	0.0	1.55	22.22	19.64	10.52
S16-18-6	44-60	B23tg	0.0	0.1	0.3	52.9	17.3	70.6	7.0	22.4	0.4	1.46	24.92	22.83	12.67
S16-18-7	60-69	B24tg	0.0	0.1	0.3	60.1	13.8	74.3	7.5	18.2	0.6	1.52	19.20	15.86	7.40
Pottsburg:															
S16-11-1	0-3	A1	0.0	0.1	1.9	87.4	2.2	91.6	6.2	2.2	---	---	---	---	---
S16-11-2	3-10	A21	0.0	0.1	1.9	88.0	2.5	92.5	4.9	2.6	---	---	---	---	---
S16-11-3	10-22	A22	0.0	0.1	1.7	88.5	2.7	93.0	4.1	2.9	---	---	---	---	---
S16-11-4	22-34	A22	0.0	0.1	1.6	89.6	3.4	94.7	3.4	1.9	---	---	---	---	---
S16-11-5	34-57	A23	0.0	0.1	1.7	92.5	2.4	96.7	2.6	0.7	---	---	---	---	---
S16-11-6	57-80	B2h	0.0	0.1	1.5	92.4	2.3	96.3	2.2	1.5	---	---	---	---	---
Ridgeland:															
S16-5-1	0-6	A1	0.0	0.1	2.4	85.1	4.4	92.0	5.0	3.0	34.2	1.18	17.24	11.78	3.62
S16-5-2	6-16	B2h	0.0	0.1	2.5	83.1	4.4	90.2	4.2	5.6	14.8	1.32	16.45	11.32	2.97
S16-5-3	16-31	A'2	0.0	0.1	2.3	86.6	4.4	93.4	3.1	3.5	17.1	1.54	8.94	5.29	1.87
S16-5-4	31-39	B'21h	0.0	0.1	2.1	88.7	3.4	94.3	2.3	3.4	1.3	1.50	18.91	12.85	2.37
S16-5-5	39-80	B'22h	0.0	0.2	2.9	89.5	1.9	94.5	2.7	2.8	2.7	1.52	17.64	12.90	1.55
Sapelo:															
S16-15-1	0-3	A11	0.0	0.0	0.8	80.7	5.1	86.6	11.0	2.4	---	---	---	---	---
S16-15-2	3-6	A12	0.0	0.0	0.6	85.9	6.5	93.0	5.2	1.8	---	---	---	---	---
S16-15-3	6-23	A2	0.0	0.0	0.6	88.6	6.6	95.8	3.4	0.8	---	---	---	---	---
S16-15-4	23-30	B21h	0.0	0.0	0.6	83.7	5.8	90.1	4.9	5.0	---	---	---	---	---
S16-15-5	30-32	B22h	0.0	0.0	0.6	84.2	6.0	90.8	4.5	4.7	---	---	---	---	---
S16-15-6	32-38	Bh&B3	0.0	0.0	0.5	87.6	6.9	95.0	3.5	1.5	---	---	---	---	---
S16-15-7	38-56	A'2	0.0	0.0	0.4	89.5	3.9	94.2	2.3	3.5	---	---	---	---	---
S16-15-8	56-62	B'21tg	0.0	0.0	0.3	74.5	2.8	77.6	2.1	20.3	---	---	---	---	---
S16-15-9	62-80	B'22tg	0.0	0.0	0.4	78.3	2.9	81.6	1.5	16.9	---	---	---	---	---
Stockade:															
S16-12-1	0-12	A1	0.0	0.1	1.3	65.4	1.3	68.1	15.0	16.9	---	---	---	---	---
S16-12-2	12-26	B21tg	0.1	0.4	1.9	65.4	1.1	68.9	9.1	22.0	---	---	---	---	---
S16-12-3	26-36	B22tg	0.8	1.7	2.6	62.0	1.8	68.9	8.4	22.7	---	---	---	---	---
S16-12-4	36-46	B22tg	0.0	0.4	1.7	66.0	1.2	69.3	8.1	22.6	---	---	---	---	---

TABLE 18.--PHYSICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Particle size distribution (Percent less than 2 mm)								Hydr. cond. (sat.)	Bulk density field moist	Water content		
			Sand												
			Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002			1/10 bar	1/3 bar	15 bar
	In										Cm/hr	G/cc	------Pct (wt)------		
Surrency:															
S16-21-1	0-14	A11	0.0	0.1	0.4	68.8	11.0	80.3	17.3	2.4	---	---	---	---	---
S16-21-2	14-18	A12	0.0	0.0	0.4	76.5	11.1	88.0	9.1	2.9	---	---	---	---	---
S16-21-3	18-26	A2	0.0	0.1	0.4	81.8	12.1	94.4	4.2	1.4	---	---	---	---	---
S16-21-4	26-38	B21tg	0.0	0.1	0.3	67.1	10.6	78.1	8.2	13.7	---	---	---	---	---
S16-21-5	38-49	B22tg	0.0	0.0	0.5	68.8	10.0	79.4	6.1	14.5	---	---	---	---	---
S16-21-6	49-70	B23tg	0.0	0.1	1.6	67.5	7.6	76.8	5.6	17.6	---	---	---	---	---
S16-21-7	70-80	Cg	0.0	0.0	0.6	52.5	9.3	62.4	8.3	29.3	---	---	---	---	---
Wesconnett:															
S16-24-1	0-2	A1	0.1	0.3	3.6	78.3	2.5	84.8	13.3	1.9	---	---	---	---	---
S16-24-2	2-10	B21h	0.0	0.4	3.4	85.2	2.7	91.7	6.4	1.9	---	---	---	---	---
S16-24-3	10-26	B22h	0.1	0.3	3.5	85.0	2.7	91.6	5.8	2.6	---	---	---	---	---
S16-24-4	26-32	B23h	0.0	0.5	4.2	87.7	2.1	94.5	3.2	2.3	---	---	---	---	---
S16-24-5	32-44	A'2	0.1	0.5	3.8	88.4	2.3	95.1	3.2	1.7	---	---	---	---	---
S16-24-6	44-72	B'21h	0.2	0.6	1.3	89.5	1.3	92.9	3.8	3.3	---	---	---	---	---
S16-24-7	72-80	B'22h	0.0	0.0	0.6	92.1	1.3	94.0	3.7	2.3	---	---	---	---	---
Yonges:															
S16-16-1	0-3	Ap	0.1	0.9	8.3	50.3	8.5	68.1	21.8	10.1	---	---	---	---	---
S16-16-2	3-6	A2	0.3	2.3	13.2	56.0	7.8	79.6	11.7	8.7	---	---	---	---	---
S16-16-3	6-25	B21tg	0.1	1.5	8.5	41.6	6.3	58.0	12.0	30.0	---	---	---	---	---
S16-16-4	25-31	B22tg	1.4	2.7	8.2	35.2	7.0	54.5	13.2	32.3	---	---	---	---	---
S16-16-5	31-55	B23tg	1.5	2.8	8.8	35.7	6.3	55.1	12.6	32.3	---	---	---	---	---
S16-16-6	55-65	B24tg	0.2	1.5	10.1	43.3	6.4	61.5	9.9	28.6	---	---	---	---	---
S16-16-7	65-80	B3g	0.4	3.2	21.0	44.5	3.1	72.2	5.8	22.0	---	---	---	---	---
Yulee:															
S16-25-1	0-7	A11	0.0	0.1	0.2	23.7	12.8	36.8	20.0	43.2	---	---	---	---	---
S16-25-2	7-14	A12	0.0	0.0	0.1	28.7	14.7	43.5	16.5	40.0	---	---	---	---	---
S16-25-3	14-28	B21g	0.0	0.0	0.2	44.1	20.8	65.1	11.4	23.5	---	---	---	---	---
S16-25-4	28-40	B22g	---	---	---	---	---	---	---	---	---	---	---	---	---
S16-25-5	40-48	B23g	0.0	0.0	0.1	40.3	18.6	59.0	13.2	27.8	---	---	---	---	---
S16-25-6	48-66	B24g	0.0	0.0	0.2	40.0	17.4	57.6	12.6	29.8	---	---	---	---	---
S16-25-7	66-75	IIC1	0.0	0.0	0.1	23.8	31.8	55.7	15.4	28.9	---	---	---	---	---
S16-25-8	75-80	IIC2	0.0	0.0	0.1	12.5	28.6	41.2	22.9	35.9	---	---	---	---	---

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS

Soil series and sample number	Depth	Horizon	Extractable bases (5B1) Ca	Mg	Na	K	Sum	Extractable acidity	Cation exchange capacity	Base saturation	Organic carbon	Electrical conductivity	pH H_2O (1:1)	Pyrophosphate extractable C	Fe	Al	C+Al/ Clay	Citrate dithionite extractable Al	Fe
	In		Meq/100g							Pct	Pct	Mmho/ cm		Pct	Pct	Pct		Pct	Pct
Albany:																			
S16-10-1----	0-3	A1	1.74	0.23	0.02	0.05	2.04	6.00	8.04	25	1.29	0.03	5.5	---	---	---	---	0.05	0.05
S16-10-2----	3-15	A21	0.28	0.00	0.02	0.01	0.31	2.10	2.41	13	0.28	0.02	6.2	---	---	---	---	0.06	0.05
S16-10-3----	15-29	A21	0.19	0.00	0.01	0.00	0.20	1.30	1.50	13	0.14	0.01	6.3	---	---	---	---	0.05	0.05
S16-10-4----	29-39	A22	0.06	0.00	0.01	0.00	0.07	0.60	0.67	10	0.04	0.01	6.3	---	---	---	---	0.03	0.03
S16-10-5----	39-50	A22	0.11	0.00	0.02	0.00	0.13	0.30	0.43	30	0.01	0.02	6.1	---	---	---	---	0.03	0.03
S16-10-6----	50-63	B21t	0.81	1.30	0.06	0.08	2.25	4.90	7.15	31	0.04	0.02	5.6	---	---	---	---	0.20	0.85
S16-10-7----	63-88	B22tg	0.74	1.96	0.09	0.16	2.95	10.80	13.75	21	0.04	0.03	5.4	---	---	---	---	0.27	1.11
Alpin:																			
S16-20-1----	0-5	A1	2.20	0.22	0.05	0.07	2.54	5.78	8.32	31	0.99	0.14	5.3	---	---	---	---	---	---
S16-20-2----	5-11	A21	0.12	0.03	0.02	0.02	0.19	2.07	2.26	8	0.26	0.04	5.1	---	---	---	---	---	---
S16-20-3----	11-30	A22	0.06	0.02	0.02	0.01	0.11	1.78	1.89	6	0.18	0.03	4.8	---	---	---	---	---	---
S16-20-4----	30-48	A23	0.04	0.02	0.02	0.01	0.09	1.18	1.27	7	0.06	0.03	4.7	---	---	---	---	---	---
S16-20-5----	48-72	A2&B1	0.06	0.03	0.02	0.02	0.13	1.04	1.17	11	0.02	0.04	4.7	---	---	---	---	---	---
S16-20-6----	72-80	A2&B1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Blanton:																			
S16-14-1----	0-3	A1	1.00	0.06	0.03	0.04	1.13	5.30	6.43	18	1.42	0.02	5.2	---	---	---	---	0.60	0.07
S16-14-2----	3-9	A21	0.14	0.00	0.02	0.01	0.17	4.20	4.37	4	0.54	0.02	5.4	---	---	---	---	0.08	0.06
S16-14-3----	9-21	A22	0.03	0.00	0.01	0.00	0.04	2.00	2.04	2	0.29	0.02	5.6	---	---	---	---	0.07	0.05
S16-14-4----	21-36	A23	0.01	0.00	0.01	0.00	0.02	1.10	1.12	2	0.10	0.02	5.9	---	---	---	---	0.05	0.02
S16-14-5----	36-54	A24	0.00	0.00	0.01	0.00	0.01	0.30	0.31	3	0.04	0.02	5.8	---	---	---	---	0.02	0.03
S16-14-6----	54-65	B21t	0.21	0.26	0.03	0.04	0.54	5.30	5.84	9	0.13	0.02	4.9	---	---	---	---	0.22	0.60
S16-14-7----	65-80	B22t	0.18	0.58	0.05	0.04	0.85	6.90	7.75	11	0.07	0.02	5.0	---	---	---	---	0.25	1.27
Cornelia:																			
S16-6-1-----	0-7	A1	1.00	tr.	0.10	0.10	1.20	13.30	14.50	8	3.30	0.10	4.1	---	---	---	---	---	---
S16-6-2-----	7-13	A21	0.40	0.10	tr.	tr.	0.50	4.50	5.00	10	1.06	0.05	4.2	---	---	---	---	---	---
S16-6-3-----	13-39	A22	0.20	0.10	tr.	tr.	0.30	0.80	1.10	27	0.20	0.02	4.8	---	---	---	---	0.00	0.01
S16-6-4-----	39-44	B21h	0.80	0.20	0.10	tr.	1.10	19.00	20.10	5	1.45	0.06	4.4	1.20	0.29	0.16	0.14	0.15	0.25
S16-6-5-----	44-53	B22h	0.30	tr.	0.20	tr.	0.50	18.60	19.10	3	1.16	0.12	4.5	0.96	0.17	0.34	0.30	0.06	0.02
S16-6-6-----	53-73	B23h	0.10	tr.	0.10	0.00	0.20	7.00	7.20	3	0.50	0.08	4.9	0.48	0.03	0.18	0.25	0.04	0.00
S16-6-7-----	73-92	B24h	0.10	tr.	0.10	0.00	0.20	8.70	8.90	2	0.71	0.06	5.2	0.38	0.02	0.19	0.34	0.06	0.00
S16-6-8-----	92-106	B25h	0.10	tr.	tr.	0.00	0.10	6.90	7.00	1	0.50	0.04	5.5	0.49	0.00	0.17	0.47	0.05	0.00
Fripp:																			
S16-19-1----	0-6	A1	0.23	0.52	0.09	0.04	0.88	2.31	3.19	28	0.86	0.08	5.5	---	---	---	---	---	---
S16-19-2----	6-30	C1	0.19	0.12	0.03	0.01	0.35	0.71	1.06	33	0.04	0.48	5.9	---	---	---	---	---	---
S16-19-3----	30-54	C2	0.18	0.14	0.04	0.01	0.37	0.36	0.73	51	0.04	1.15	6.2	---	---	---	---	---	---
S16-19-4----	54-78	C3	0.19	0.15	0.05	0.02	0.41	0.27	0.68	60	0.02	0.04	6.7	---	---	---	---	---	---
S16-19-5----	78-90	C4	2.20	0.12	0.05	0.01	2.38	0.00	2.38	100	0.01	0.05	6.8	---	---	---	---	---	---
Kershaw:																			
S16-7-1-----	0-3	A1	0.5	0.1	tr.	tr.	0.60	4.00	4.60	13	1.02	0.05	5.3	---	---	---	---	---	---
S16-7-2-----	3-25	C1	tr.	tr.	0.0	tr.	tr.	1.80	1.80	---	0.22	0.02	5.5	---	---	---	---	---	---
S16-7-3-----	25-51	C1	0.1	tr.	0.0	0.0	0.10	1.40	1.50	7	0.12	0.03	5.6	---	---	---	---	---	---
S16-7-4-----	51-80	C2	0.1	tr.	0.1	0.0	0.20	1.20	1.40	14	0.08	0.02	5.9	---	---	---	---	---	---

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample number	Depth	Horizon	Extractable bases (5B1) Ca	Mg	Na	K	Sum	Extractable acidity	Cation exchange capacity	Base saturation	Organic carbon	Electrical conductivity	pH H_2O (1:1)	Pyrophosphate extractable C	Fe	Al	C+Al/ Clay	Citrate dithionite extractable Al	Fe
	In		Meq/100g							Pct	Pct	Mmho/ cm		Pct	Pct	Pct		Pct	Pct
Kureb:																			
S16-4-1-----	0-4	A1	0.60	0.10	tr.	tr.	0.70	4.30	5.00	14	1.36	0.04	4.6	---	---	---	---	---	---
S16-4-2-----	4-16	A2	tr.	tr.	tr.	0.0	tr.	0.00	---	---	0.06	0.01	5.4	---	---	---	---	0.00	0.01
S16-4-3-----	16-38	C&Bh	tr.	tr.	tr.	0.00	tr.	0.40	0.40	---	0.10	0.03	4.9	0.12	0.04	0.06	0.60	0.06	0.05
S16-4-4-----	38-60	C&Bh	tr.	tr.	tr.	0.00	tr.	0.20	0.20	---	0.06	0.03	5.1	0.06	0.40	0.05	0.14	0.04	0.04
S16-4-5-----	60-82	C	tr.	tr.	tr.	0.00	tr.	0.40	0.40	---	0.06	0.02	5.4	---	---	---	---	0.04	0.03
Leon:																			
S16-9-1-----	0-5	A11	1.10	0.36	0.05	0.06	1.57	10.50	12.07	13	2.16	0.06	4.2	---	---	---	---	0.01	0.03
S16-9-2-----	5-8	A12	0.30	0.15	0.03	0.01	0.49	3.40	3.89	13	0.68	0.03	4.6	---	---	---	---	---	---
S16-9-3-----	8-18	A2	0.06	0.03	0.01	0.00	0.10	0.80	0.90	11	0.17	0.02	5.4	---	---	---	---	---	---
S16-9-4-----	18-26	B21h	0.01	0.03	0.03	0.02	0.09	15.20	15.29	1	1.47	0.10	4.0	1.40	0.01	0.18	0.45	0.13	0.02
S16-9-5-----	26-37	B22h	0.01	0.03	0.03	0.00	0.07	6.10	6.17	1	0.24	0.03	4.5	0.56	0.01	0.05	0.32	0.04	0.02
S16-9-6-----	37-45	B3	0.02	0.01	0.02	0.01	0.06	3.60	3.66	2	0.31	0.04	4.9	0.26	0.01	0.10	0.21	0.05	0.02
S16-9-7-----	45-80	B'2h	0.02	0.02	0.01	0.00	0.05	7.90	7.95	1	0.62	0.03	5.0	0.70	0.01	0.23	0.39	0.17	0.02
Lynn Haven:																			
S16-23-1----	0-7	A11	0.21	0.16	0.04	0.03	0.44	2.27	2.71	16	2.18	0.08	4.0	---	---	---	---	---	---
S16-23-2----	7-13	A12	0.07	0.02	0.00	0.00	0.09	1.82	1.91	5	0.53	0.03	4.6	---	---	---	---	---	---
S16-23-3----	13-21	A2	0.02	0.00	0.00	0.00	0.02	19.08	19.10	>1	0.28	0.02	5.0	---	---	---	---	---	---
S16-23-4----	21-35	B21h	0.03	0.02	0.01	0.01	0.07	14.99	15.06	1	2.22	0.07	4.4	0.86	0.00	0.30	0.21	0.24	0.04
S16-23-5----	35-48	B22h	0.04	0.02	0.01	0.00	0.07	15.90	15.97	>1	1.44	0.06	4.6	1.22	0.00	0.28	0.28	0.26	0.05
S16-23-6----	48-62	B31h	0.04	0.07	0.05	0.01	0.17	8.77	8.94	2	0.56	0.27	5.1	0.57	0.01	0.25	0.14	0.18	0.07
S16-23-7----	62-80	B32h	0.04	0.06	0.01	0.01	0.12	8.04	8.16	2	0.60	0.08	5.0	---	---	---	---	---	---
Mandarin:																			
S16-13-1----	0-4	A1	0.85	0.21	0.01	0.00	1.07	10.60	11.67	9	1.24	0.90	4.3	---	---	---	---	0.02	0.05
S16-13-2----	4-8	A21	0.38	0.01	0.03	0.03	0.45	7.20	7.65	6	0.08	0.04	3.0	---	---	---	---	---	---
S16-13-3----	8-26	A22	0.04	0.00	0.01	0.00	0.05	0.60	0.65	8	0.14	0.02	5.3	---	---	---	---	---	---
S16-13-4----	26-30	B21h	0.18	0.07	0.04	0.02	0.31	15.00	15.31	2	2.10	0.03	4.5	1.24	0.01	0.15	0.34	0.12	0.01
S16-13-5----	30-35	B22h	0.03	0.02	0.02	0.01	0.08	21.10	21.18	>1	1.86	0.02	4.8	1.74	0.01	0.30	0.37	0.24	0.01
S16-13-6----	35-40	B23h	0.00	0.02	0.04	0.01	0.07	26.00	26.07	>1	2.54	0.04	4.7	2.18	0.01	0.31	0.40	0.30	0.01
S16-13-7----	40-46	B3	0.01	0.00	0.01	0.00	0.02	2.00	2.02	1	0.27	0.02	5.7	0.17	0.00	0.03	0.10	0.03	0.02
S16-13-8----	46-56	A'21	0.01	0.00	0.01	0.00	0.02	0.60	0.62	3	0.07	0.02	6.3	---	---	---	---	---	---
S16-13-9----	56-62	A'22	0.00	0.00	0.01	0.00	0.01	0.30	0.31	3	0.04	0.02	6.6	---	---	---	---	---	---
S16-13-10---	62-73	A'23	0.00	0.00	0.01	0.00	0.01	1.30	1.71	1	0.14	0.02	6.6	---	---	---	---	---	---
S16-13-11---	73-80	B'2h	0.00	0.00	0.02	0.00	0.02	7.00	7.02	>1	0.65	0.02	5.8	0.60	0.00	0.13	0.43	0.11	0.03
Mascotte:																			
S16-8-1-----	0-5	A1	1.46	0.72	0.10	0.10	2.38	25.30	27.68	9	6.76	0.09	3.9	---	---	---	---	0.03	0.06
S16-8-2-----	5-8	A21	0.26	0.10	0.01	0.01	0.38	4.40	4.78	8	0.48	0.02	4.5	---	---	---	---	0.00	0.02
S16-8-3-----	8-15	A22	0.14	0.02	0.01	0.00	0.17	1.10	1.27	13	0.14	0.02	5.2	---	---	---	---	0.00	0.02
S16-8-4-----	15-21	B21h	0.21	0.15	0.03	0.01	0.40	22.20	22.60	2	2.58	0.03	4.6	1.94	0.02	0.24	0.23	0.24	0.04
S16-8-5-----	21-23	B22h	0.11	0.13	0.06	0.02	0.32	37.10	37.42	1	3.24	0.03	4.7	2.95	0.01	0.54	0.32	0.54	0.02
S16-8-6-----	23-25	B23h	0.03	0.04	0.04	0.02	0.13	18.70	18.83	1	1.23	0.03	5.0	1.18	0.02	0.39	0.21	0.37	0.04
S16-8-7-----	25-28	A'2&B3	0.02	0.08	0.03	0.00	0.13	8.40	8.53	2	0.44	0.03	5.1	0.24	0.04	0.15	0.05	0.16	0.07
S16-8-8-----	28-46	B'21tg	0.09	0.73	0.06	0.00	0.88	11.40	12.28	7	0.15	0.03	5.0	---	---	---	---	0.29	1.43
S16-8-9-----	46-58	B'22tg	0.08	0.65	0.05	0.03	0.81	7.00	7.81	10	0.08	0.03	5.1	---	---	---	---	0.16	0.95
S16-8-10----	58-80	Cg	0.10	0.43	0.05	0.02	0.60	3.00	3.60	17	0.01	0.02	5.6	---	---	---	---	0.04	0.03

Soil series and sample number	Depth	Horizon	Extractable bases (5B1)					Extractable acidity	Cation exchange capacity	Base saturation	Organic carbon	Electrical conductivity	pH H_2O (1:1)	Pyrophosphate extractable				Citrate dithionite extractable	
			Ca	Mg	Na	K	Sum							C	Fe	Al	C+Al/ Clay	Al	Fe
	In		Meq/100g							Pct	Pct	Mmho/ cm		Pct	Pct	Pct		Pct	Pct
Olustee:																			
S16-22-1----	0-6	A1	0.74	0.40	0.19	0.06	1.39	22.71	24.10	6	3.58	0.22	3.8	---	---	---	---	---	---
S16-22-2----	6-11	B21h	0.11	0.04	0.01	0.01	0.17	5.00	5.17	3	0.68	0.06	4.4	0.42	0.02	0.10	0.23	0.06	0.07
S16-22-3----	11-21	B22h	0.09	0.03	0.02	0.01	0.15	12.49	12.64	1	1.26	0.06	4.7	1.02	0.04	0.30	0.28	0.21	0.09
S16-22-4----	21-36	A'2	0.02	0.00	0.02	0.00	0.04	4.31	4.35	1	0.41	0.08	4.6	---	---	---	---	---	---
S16-22-5----	36-54	B'2tg	0.71	1.15	0.08	0.03	1.97	11.81	13.78	14	0.19	0.06	4.8	---	---	---	---	---	---
S16-22-6----	54-64	C1g	0.04	0.03	0.02	0.01	0.10	9.99	10.09	1	0.72	0.07	4.5	---	---	---	---	---	---
S16-22-7----	64-80	C2g	0.32	0.71	0.15	0.03	1.22	14.53	15.75	8	0.06	0.11	5.0	---	---	---	---	---	---
Ortega:																			
S16-3-1-----	0-5	A1	0.40	0.10	0.00	0.00	0.50	3.00	3.50	14	1.00	0.07	4.8	---	---	---	---	---	---
S16-3-2-----	5-33	C1	0.00	0.00	0.00	0.00	0.00	1.10	1.10	0	0.21	0.02	5.3	---	---	---	---	---	---
S16-3-3-----	33-48	C2	0.00	0.00	0.00	0.00	0.00	0.90	0.90	0	0.07	0.02	5.6	---	---	---	---	0.03	0.04
S16-3-4-----	48-63	C3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.03	0.02	6.4	---	---	---	---	0.01	0.01
S16-3-5-----	63-82	C4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.01	0.02	6.2	---	---	---	---	0.01	0.01
Pelham:																			
S16-18-1----	0-6	Ap	1.66	0.28	0.05	0.05	2.04	2.22	4.26	48	2.56	0.08	4.6	---	---	---	---	0.06	0.10
S16-18-2----	6-14	A21	0.10	0.03	0.01	0.01	0.15	5.63	5.78	3	0.43	0.03	4.8	---	---	---	---	0.06	0.08
S16-18-3----	14-21	A22	0.09	0.04	0.01	0.01	0.15	2.96	3.11	5	0.12	0.04	4.8	---	---	---	---	0.06	0.14
S16-18-4----	21-26	B21tg	0.37	0.50	0.03	0.03	0.93	9.56	10.49	9	0.10	0.08	4.7	---	---	---	---	0.10	0.38
S16-18-5----	26-44	B22tg	0.46	2.10	0.08	0.05	2.69	20.00	22.69	12	0.13	0.06	4.5	---	---	---	---	0.22	0.97
S16-18-6----	44-60	B23tg	0.54	2.18	0.10	0.06	2.88	15.55	18.43	16	0.08	0.11	4.6	---	---	---	---	0.15	0.98
S16-18-7----	60-69	B24tg	0.92	2.34	0.15	0.08	3.49	12.44	15.93	22	0.06	0.13	4.7	---	---	---	---	0.10	0.38
Pottsburg:																			
S16-11-1----	0-3	A1	0.63	0.06	0.04	0.05	0.78	6.80	7.58	10	1.38	0.16	4.5	---	---	---	---	0.05	0.03
S16-11-2----	3-10	A21	0.06	0.01	0.02	0.02	0.11	4.90	5.01	2	0.73	0.02	5.6	---	---	---	---	---	---
S16-11-3----	10-22	A22	0.01	0.01	0.02	0.01	0.05	3.10	3.15	2	0.35	0.02	5.8	---	---	---	---	---	---
S16-11-4----	22-34	A22	0.01	0.00	0.01	0.00	0.02	2.20	2.22	1	0.20	0.02	5.8	---	---	---	---	---	---
S16-11-5----	34-57	A23	0.04	0.00	0.04	0.00	0.08	0.40	0.48	17	0.04	0.03	6.3	---	---	---	---	---	---
S16-11-6----	57-80	B2h	0.01	0.00	0.01	0.00	0.02	5.50	5.52	>1	0.42	0.04	5.5	0.36	0.01	0.20	0.37	0.09	0.04
Ridgeland:																			
S16-5-1-----	0-6	A1	0.50	0.10	tr.	tr.	0.60	6.90	7.50	8	1.34	0.06	4.4	---	---	---	---	0.04	0.02
S16-5-2-----	6-16	B2h	0.30	tr.	0.10	tr.	0.40	14.20	14.60	3	1.60	0.09	4.9	1.32	0.02	0.30	0.29	0.29	0.02
S16-5-3-----	16-31	A'2	0.10	tr.	tr.	tr.	0.10	3.40	3.50	3	0.36	0.04	5.3	---	---	---	---	0.11	0.04
S16-5-4-----	31-39	B'21h	0.10	tr.	tr.	tr.	0.10	4.70	4.80	2	0.28	0.06	5.2	0.37	0.02	0.16	0.16	0.17	0.04
S16-5-5-----	39-80	B'22h	0.10	tr.	tr.	0.00	0.10	10.90	11.00	1	0.72	0.06	5.1	0.68	0.01	0.33	0.36	0.24	0.02
Sapelo:																			
S16-15-1----	0-3	A11	1.51	0.30	0.06	0.08	1.95	9.90	11.85	16	2.31	0.06	4.4	---	---	---	---	0.03	0.04
S16-15-2----	3-6	A12	0.74	0.13	0.02	0.01	0.90	3.80	4.70	19	0.84	0.02	4.9	---	---	---	---	---	---
S16-15-3----	6-23	A2	0.05	0.00	0.02	0.00	0.07	1.10	1.17	6	0.13	0.03	6.2	---	---	---	---	---	---
S16-15-4----	23-30	B21h	1.10	0.02	0.04	0.01	1.17	18.80	19.97	6	2.04	0.03	4.6	1.69	0.01	0.23	0.38	0.19	0.02
S16-15-5----	30-32	B22h	0.06	0.02	0.02	0.00	0.10	19.60	19.70	1	1.64	0.02	4.7	1.50	0.01	0.25	0.37	0.20	0.00
S16-15-6----	32-38	Bh&B3	0.01	0.00	0.01	0.00	0.02	3.80	3.82	1	0.34	0.15	5.5	0.19	0.01	0.09	0.19	0.07	0.02
S16-15-7----	38-56	A'2	0.01	0.00	0.02	0.00	0.03	4.00	4.03	1	0.30	0.02	4.4	---	---	---	---	0.09	0.08
S16-15-8----	56-62	B'21tg	0.04	0.05	0.02	0.01	0.12	10.20	10.32	1	0.45	0.02	5.1	---	---	---	---	0.19	0.08
S16-15-9----	62-80	B'22tg	0.13	0.63	0.05	0.05	0.86	6.40	7.26	12	0.15	0.04	5.3	---	---	---	---	0.14	0.57

TABLE 19.--CHEMICAL PROPERTIES OF SELECTED SOILS--Continued

Soil series and sample number	Depth	Horizon	Extractable bases (5B1)					Extractable acidity	Cation exchange capacity	Base saturation	Organic carbon	Electrical conductivity	pH H2O (1:1)	Pyrophosphate extractable				Citrate dithionite extractable	
			Ca	Mg	Na	K	Sum							C	Fe	Al	C+Al/ Clay	Al	Fe
	In		Meq/100g							Pct	Pct	Mmho/ cm		Pct	Pct	Pct		Pct	Pct
Stockade:																			
S16-12-1----	0-12	A1	8.86	1.14	0.20	0.09	10.29	16.20	26.49	39	1.87	0.16	5.2	---	---	---	---	0.11	0.06
S16-12-2----	12-26	B21tg	13.41	1.93	0.24	0.02	15.60	7.60	23.20	67	0.31	0.14	6.4	---	---	---	---	0.03	0.51
S16-12-3----	26-36	B22tg	13.23	1.46	0.21	0.04	14.94	6.70	21.64	69	0.25	0.17	6.8	---	---	---	---	0.03	0.15
S16-12-4----	36-46	B22tg	14.11	1.42	0.40	0.03	15.96	5.90	21.86	73	0.54	0.27	7.1	---	---	---	---	0.03	0.07
Surrency:																			
S16-21-1----	0-14	A11	0.58	0.11	0.05	0.03	0.77	15.44	16.21	5	2.75	0.14	4.6	---	---	---	---	---	---
S16-21-2----	14-18	A12	0.04	0.02	0.01	0.00	0.07	5.68	5.75	1	0.85	0.07	4.6	---	---	---	---	---	---
S16-21-3----	18-26	A2	0.02	0.02	0.01	0.00	0.05	1.14	1.19	4	0.14	0.05	4.9	---	---	---	---	---	---
S16-21-4----	26-38	B21tg	0.26	0.68	0.18	0.02	1.14	5.45	6.59	17	0.23	0.08	4.6	---	---	---	---	0.06	0.27
S16-21-5----	38-49	B22tg	0.71	1.02	0.27	0.02	2.02	6.81	8.83	23	0.24	0.08	4.8	---	---	---	---	0.06	0.10
S16-21-6----	49-70	B23tg	1.79	1.98	0.35	0.06	4.18	6.81	10.99	38	0.11	0.20	4.5	---	---	---	---	---	---
S16-21-7----	70-80	Cg	4.39	3.54	1.34	0.15	9.42	10.90	20.32	46	0.10	0.31	4.2	---	---	---	---	---	---
Wesconnett:																			
S16-24-1----	0-2	A1	0.13	0.10	0.03	0.08	0.34	26.80	27.14	1	2.97	0.14	3.9	---	---	---	---	---	---
S16-24-2----	2-10	B21h	0.02	0.03	0.00	0.03	0.08	10.81	10.89	1	1.86	0.06	4.1	0.58	0.00	0.05	0.37	---	---
S16-24-3----	10-26	B22h	0.01	0.02	0.00	0.01	0.04	10.58	10.62	>1	1.35	0.05	4.4	0.66	0.00	0.10	0.29	0.07	0.06
S16-24-4----	26-32	B23h	0.01	0.01	0.00	0.00	0.02	4.95	4.97	>1	0.74	0.04	4.7	0.49	0.00	0.10	0.26	0.08	0.06
S16-24-5----	32-44	A'2	0.01	0.00	0.00	0.00	0.01	1.45	1.46	1	0.17	0.28	5.1	---	---	---	---	---	---
S16-24-6----	44-72	B'21h	0.02	0.01	0.00	0.00	0.03	11.41	11.44	>1	1.17	0.42	5.1	0.86	0.02	0.35	0.37	0.37	0.05
S16-24-7----	72-80	B'22h	0.01	0.00	0.00	0.00	0.01	17.20	17.21	>1	1.30	0.46	5.2	1.17	0.01	0.50	0.73	0.44	0.04
Yonges:																			
S16-16-1----	0-3	Ap	17.16	4.49	0.30	0.31	22.26	3.00	25.26	88	3.65	0.38	7.1	---	---	---	---	0.03	0.08
S16-16-2----	3-6	A2	5.70	2.20	0.14	0.08	8.12	1.40	9.52	85	0.65	0.24	7.6	---	---	---	---	0.03	0.09
S16-16-3----	6-25	B21tg	14.41	8.11	0.21	0.06	22.79	5.30	28.09	81	0.37	0.34	8.0	---	---	---	---	0.07	0.32
S16-16-4----	25-31	B22tg	27.00	6.79	0.16	0.05	34.00	3.90	37.90	90	0.24	0.29	8.2	---	---	---	---	0.06	0.32
S16-16-5----	31-55	B23tg	25.50	8.79	0.18	0.05	34.52	4.80	39.32	88	0.14	0.32	8.2	---	---	---	---	0.08	0.43
S16-16-6----	55-65	B24tg	12.29	6.36	0.15	0.08	18.88	4.70	23.58	80	0.08	0.26	8.1	---	---	---	---	0.04	0.19
S16-16-7----	65-80	B3g	8.98	5.66	0.12	0.06	14.82	5.00	19.82	75	0.09	0.18	8.1	---	---	---	---	0.04	0.19
Yulee:																			
S16-25-1----	0-7	A11	17.62	2.51	1.88	0.12	22.13	21.35	43.48	51	2.32	0.54	5.1	---	---	---	---	---	---
S16-25-2----	7-14	A12	21.48	2.63	1.01	0.07	25.19	14.08	39.27	64	1.16	0.46	6.0	---	---	---	---	---	---
S16-25-3----	14-28	B21g	15.42	1.65	0.71	0.04	17.82	6.36	24.18	74	0.21	0.49	7.9	---	---	---	---	---	---
S16-25-4----	28-40	B22g	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S16-25-5----	40-48	B23g	18.28	1.56	0.40	0.05	20.29	7.95	28.24	72	0.10	0.46	7.9	---	---	---	---	---	---
S16-25-6----	48-66	B24g	19.02	1.24	0.29	0.06	20.61	8.63	29.24	70	0.10	0.32	7.9	---	---	---	---	---	---
S16-25-7----	66-75	IIC1	18.70	0.75	0.15	0.12	19.72	8.63	28.35	70	0.09	0.36	8.0	---	---	---	---	---	---
S16-25-8----	75-80	IIC2	23.52	0.51	0.16	0.19	24.37	9.99	34.36	71	0.07	0.48	8.4	---	---	---	---	---	---

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS

Soil series and sample numbers	Depth	Horizon	Percentage of clay minerals					
			Mont-morillonite	14Å intergrade	Kaolinite	Gibbsite	Quartz	Mica
	In							
Albany:								
S16-10-1	0-3	A1	0	41	27	0	32	0
S16-10-4	29-39	A22	0	31	20	11	36	2
S16-10-6	50-63	B21t	tr	22	53	0	15	10
Alpin:								
S16-20-1	0-5	A1	0	43	25	0	32	0
S16-20-4	30-48	A23	0	41	34	0	25	0
S16-20-6	72-80	A2&B1	0	36	42	0	22	0
Blanton:								
S16-14-1	0-3	A1	0	36	14	0	50	0
S16-14-4	21-36	A23	0	9	2	0	89	0
S16-14-6	54-65	B21t	0	39	38	0	13	10
S16-14-8	81-90	B22t	3	30	46	0	11	10
Cornelia:								
S16-6-1	0-7	A1	0	47	10	0	43	0
S16-6-4	39-44	B21h	47	9	12	0	32	0
S16-6-6	73-92	B24h	0	20	10	0	70	0
Fripp:								
S16-19-1	0-6	A1	27	tr	10	0	63	0
S16-19-3	30-54	C2	0	25	29	0	46	0
S16-19-5	78-90	C4	0	0	18	0	66	16
Kershaw:								
S16-7-1	0-3	A1	30	18	8	0	34	10
S16-7-3	25-51	C1	0	54	13	10	23	0
S16-7-4	51-80	C2	0	61	11	6	22	0
Kureb:								
S16-4-1	0-4	A1	0	48	11	0	41	0
S16-4-3	16-38	C&Bh	0	36	11	0	53	0
S16-4-5	60-82	C	0	52	9	0	39	0
Leon:								
S16-9-1	0-5	A11	0	0	3	0	97	0
S16-9-4	18-26	B21h	19	12	7	0	62	0
S16-9-7	45-80	B'2h	10	51	14	0	52	0
Lynn Haven:								
S16-23-1	0-7	A11	tr	tr	0	0	30	0
S16-23-4	21-35	B21h	0	31	14	0	55	0
S16-23-7	62-80	B32h	17	13	32	0	38	0
Mandarin:								
S16-13-1	0-4	A1	85	9	5	0	1	0
S16-13-5	30-35	B22h	0	27	5	0	68	0
S16-13-11	73-80	B'2h	0	12	5	0	83	0
Mascotte:								
S16-8-1	0-5	A1	0	8	5	0	87	0
S16-8-4	15-21	B21h	0	7	6	0	87	0
S16-8-8	28-46	B'21tg	50	22	24	0	4	0
S16-8-10	58-80	Cg	59	18	21	0	2	0
Olustee:								
S16-22-1	0-5	A1	0	14	9	0	77	0
S16-22-3	11-21	B22h	0	27	22	0	51	0
S16-22-5	36-54	B'2tg	49	20	24	0	7	0
S16-22-7	64-80	C2g	55	14	23	0	8	0
Ortega:								
S16-3-1	0-5	A1	0	39	0	0	61	0
S16-3-2	5-33	C1	0	39	9	0	52	0
S16-3-5	63-82	C4	0	48	10	2	40	0

TABLE 20.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil series and sample numbers	Depth	Horizon	Percentage of clay minerals: Mont-morillonite	14Å intergrade	Kaolinite	Gibbsite	Quartz	Mica
	In							
Pelham:								
S16-18-1	0-6	Ap	34	16	15	0	35	0
S16-18-6	44-60	B23tg	75	8	11	0	6	0
Pottsburg:								
S16-11-1	0-3	A1	tr	36	14	0	50	0
S16-11-6	57-80	B2h	tr	12	6	0	82	0
Ridgeland:								
S16-5-1	0-6	A1	16	20	12	0	52	0
S16-5-2	6-16	B2h	tr	30	11	7	52	0
S16-5-5	39-80	B'22h	0	0	41	39	20	0
Sapelo:								
S16-15-1	0-3	A11	31	0	3	0	66	0
S16-15-4	23-30	B21h	0	39	25	0	36	0
S16-15-8	56-62	B'21tg	7	36	47	0	10	0
Stockade:								
S16-12-1	0-12	A1	76	13	2	0	9	0
S16-12-2	12-26	B21tg	86	7	2	0	5	0
S16-12-4	36-46	B22tg	82	6	2	0	10	0
Surrency:								
S16-21-1	0-14	A11	tr	28	12	0	60	0
S16-21-4	26-38	B21tg	tr	35	25	0	40	0
S16-21-6	49-70	B23tg	71	tr	15	0	7	7
S16-21-7	70-80	Cg	76	tr	16	0	8	tr
Wesconnett:								
S16-24-1	0-2	A1	0	34	3	0	63	0
S16-24-2	2-10	B21h	0	25	2	0	73	0
S16-24-3	10-26	B22h	0	41	2	0	57	0
S16-24-4	26-32	B23h	0	33	3	0	64	0
S16-24-5	32-44	A'2	0	20	7	0	73	0
S16-24-6	44-72	B'21h	0	tr	0	0	50	0
S16-24-7	72-80	B'22h	0	0	0	0	0	0
Yonges:								
S16-16-1	0-3	Ap	61	21	6	0	12	0
S16-16-3	6-25	B21tg	91	3	3	0	3	0
S16-16-5	31-55	B23tg	79	6	11	0	4	0
S16-16-7	65-80	B3g	85	8	5	0	2	0
Yulee:								
S16-25-1	0-7	A11	75	0	8	0	17	0
S16-25-2	7-14	A12	86	0	4	0	10	0
S16-25-3	14-28	B21g	94	0	2	0	4	0
S16-25-4	28-40	B22g	---	---	---	---	---	---
S16-25-5	40-48	B23g	95	0	3	0	2	0
S16-25-6	48-66	B24g	95	0	3	0	2	0
S16-25-7	66-75	IIC1	93	0	4	0	3	0
S16-25-8	75-80	IIC2	92	0	6	0	2	0

TABLE 21.--ENGINEERING TEST DATA

[Tests performed by the Florida Department of Transportation (FDOT)in cooperation with the U.S. Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO) (1). NP means nonplastic]

Soil name and location	FDOT report number	Depth	Moisture density[1]: Maximum dry density	Moisture density[1]: Optimum moisture content	Mechanical analysis[2]: Percentage passing sieve--: No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	Percentage smaller than--: 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification: AASHTO[3]	Unified
		In	Pcf	Pct											
Albany fine sand:															
100 feet east of Biscayne Road, 1.75 miles north of Dunn Avenue, Land Grant 38, T. 1 N., R. 26 E.	6	3-29	100.9	16.0	100	100	13	9	4	0	0	---	NP	A-2-4(0)	SM
	7	63-87	104.1	18.7	100	100	49	44	36	30	28	37	20	A-6(6)	SC
Alpin fine sand:															
0.1 mile north of Moncrief Road, 1.5 miles west of Lem Turner Road, Land Grant 39, T. 1 S., R. 26 E.	22	48-80	100.3	15.8	100	100	8	5	2	1	0	---	NP	A-3(0)	SP-SM
Blanton fine sand:															
0.1 mile south of I-295, 0.3 mile east of I-95 North, Land Grant 50, T. 1 S., R. 26 E.	13	54-110	109.7	17.0	100	100	25	25	22	18	16	---	NP	A-2-4(0)	SM
Fripp fine sand:															
2.3 miles north of Park Office, 1.4 miles east of Fla. A1A, on northern tip of Little Talbot Island State Park.	21	6-80	97.8	17.8	100	100	1	0	0	0	0	---	NP	A-3(0)	SP
Leon fine sand:															
800 feet west of U. S. 17, 1,600 feet north of Duval Road, NE1/4NW1/4NW1/4 sec. 20, T. 1 N., R. 27 E.	4	18-26	95.5	20.3	100	100	8	4	0	0	0	---	NP	A-3(0)	SP-SM
	5	26-37	100.3	15.1	100	100	3	3	1	0	0	---	NP	A-3(0)	SP
Mandarin fine sand:															
300 feet north of Atlantic Boulevard, 0.7 mile west of Girvin Road, NE1/4NW1/4 sec. 22, T. 25 S., R. 28 E.	12	46-62	99.7	14.9	100	100	1	0	0	0	0	---	NP	A-3(0)	SP
Mascotte fine sand:															
500 feet north of Duval Station Road, 200 feet east of Starrett Road, Land Grant 37, T. 1 N., R. 27 E.	1	15-25	92.7	22.3	100	100	15	9	3	0	0	---	NP	A-2-4(0)	SM
	2	28-46	110.1	16.3	100	100	28	28	22	19	18	---	NP	A-2-4(0)	SM
	3	46-58	106.3	15.2	100	100	19	18	15	12	11	---	NP	A-2-4(0)	SM

See footnotes at end of table.

TABLE 21.--ENGINEERING TEST DATA--Continued

Soil name and location	FDOT report number	Depth	Moisture density[1] Maximum dry density	Optimum moisture content	Mechanical analysis[2] Percentage passing sieve-- No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	Percentage smaller than-- 0.05 mm	0.02 mm	0.005 mm	0.002 mm	Liquid limit	Plasticity index	Classification AASHTO[3]	Unified
		In	Pcf	Pct											
Olustee fine sand: 2 miles north of U.S. 90, 0.8 mile west of Halsama Road, SW1/4SW1/4 sec. 11, T. 2 S., R. 24 E.	18	5-22	105.8	12.9	100	100	10	6	0	0	0	--	NP	A-3(0)	SP-SM
	19	56-80	111.0	13.0	100	100	13	12	9	7	6	--	NP	A-2-4(0)	SM
Pelham fine sand: 0.12 mile south of Edgewood Ave., 400 feet east of U.S. 1, Land Grant 44, T. 1 S., R. 26 E.	20	21-60	108.7	16.7	100	100	36	34	26	22	21	30	11	A-6(0)	SC
Pottsburg fine sand: 0.2 mile east of U.S. 1, mile south of Greenland Road, NW1/4SE1/4SW1/4 sec. 7, T. 4 S., R. 28 E.	8	10-34	102.2	15.4	100	100	7	5	2	0	0	--	NP	A-3(0)	SP-SM
	9	57-80	99.4	15.9	100	100	4	3	2	0	0	--	NP	A-3(0)	SP
Sapelo fine sand: 400 feet east of Oliver Road, 350 feet north of Terrell Road, SW1/4SE1/4-SW1/4 sec. 20, T. 1 N., R. 26 E.	14	23-32	98.7	16.7	100	100	10	6	1	0	0	--	NP	A-3(0)	SP-SM
	15	56-80	107.0	17.8	100	100	20	20	18	14	13	--	NP	A-2-4(0)	SM
Stockade fine sandy loam: 2,000 feet north of Atlantic Boulevard, 1.5 miles west of Girvin Road, NW1/4NE1/4NE1/4 sec. 21, T. 2 S., R. 28 E.	10	12-26	105.5	17.7	100	99	32	32	27	18	15	29	10	A-2-4(0)	SC
	11	46-65	97.4	14.6	100	100	2	2	0	0	0	--	NP	A-3(0)	SP
Yonges fine sandy loam: 600 feet east of Bulls Bay Road, 600 feet south of Pritchard Road, NE1/4SE1/4 sec. 34, T. 1 S., R. 25 E.	16	6-25	112.2	15.5	100	97	40	37	28	21	18	26	11	A-6(1)	SC
	17	31-55	111.7	15.8	100	92	45	42	35	29	26	34	22	A-6(5)	SC

[1]Based on AASHTO Designation T99-70 (1).

[2]Mechanical analysis according to AASHTO designation T88-70 (1). Results by this procedure differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-sized fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-sized fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

[3]Based on AASHTO Designation M 145-66 (1).

TABLE 22.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics of this taxadjunct that are outside the range of the series]

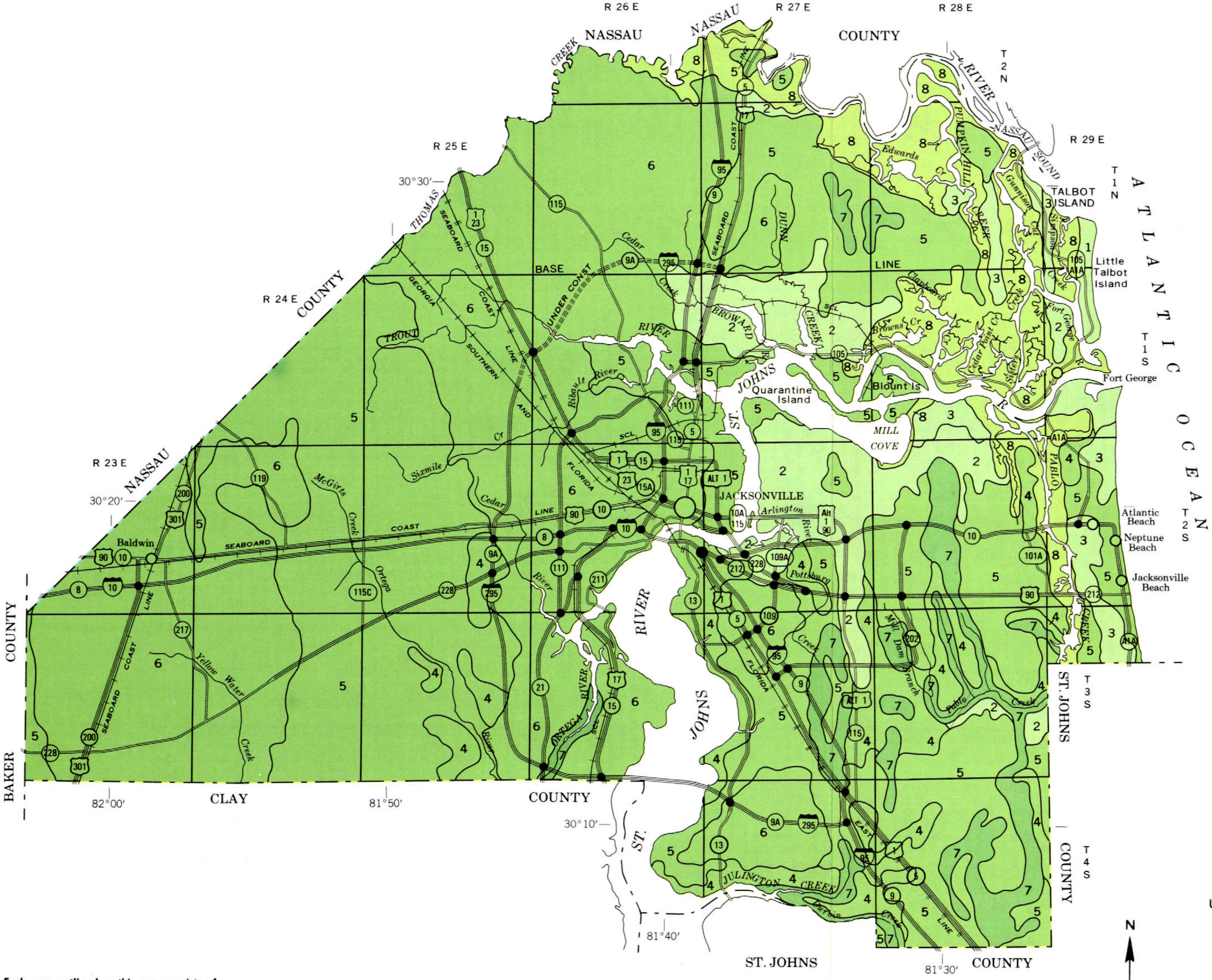
Soil name	Family or higher taxonomic class
Albany	Loamy, siliceous, thermic Grossarenic Paleudults
Alpin	Thermic, coated Typic Quartzipsamments
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Canaveral	Mixed, hyperthermic Aquic Udipsamments
Cornelia	Sandy, siliceous, thermic Arenic Haplohumods
Fripp	Mixed, thermic Typic Udipsamments
Kershaw	Thermic, uncoated Typic Quartzipsamments
Kureb	Thermic, uncoated Spodic Quartzipsamments
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Lynn Haven	Sandy, siliceous, thermic Typic Haplaquods
Mandarin	Sandy, siliceous, thermic Typic Haplohumods
Mascotte	Sandy, siliceous, thermic Ultic Haplaquods
Maurepas	Euic, thermic Typic Medisaprists
Olustee	Sandy, siliceous, thermic Ultic Haplaquods
Ortega	Thermic, uncoated Typic Quartzipsamments
Pamlico	Sandy or sandy-skeletal, siliceous, dysic, thermic Terric Medisaprists
Pelham	Loamy, siliceous, thermic Arenic Paleaquults
Pottsburg	Sandy, siliceous, thermic Grossarenic Haplaquods
*Ridgeland	Sandy, mixed, thermic Typic Haplaquods
Sapelo	Sandy, siliceous, thermic Ultic Haplaquods
Stockade	Fine-loamy, mixed, thermic Typic Umbraqualfs
*Surrency	Loamy, siliceous, thermic Arenic Umbric Paleaquults
Tisonia	Clayey, montmorillonitic, euic, thermic Typic Sulfihemists
Wesconnett	Sandy, siliceous, thermic Typic Haplaquods
Yonges	Fine-loamy, mixed, thermic Typic Ochraqualfs
Yulee	Fine-loamy, mixed, thermic Typic Haplaquolls

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978— 245-115/74

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



LEGEND

SOILS OF THE SAND RIDGES

1	AQUIC QUARTZIPSAMMENTS–FRIPP: Nearly level to sloping, excessively drained and moderately well drained soils that are sandy throughout; some have been modified by dredging and earthmoving operations
2	KERSHAW–ORTEGA: Nearly level to sloping, excessively drained and moderately well drained soils that are sandy throughout
3	MANDARIN–KUREB: Nearly level to moderately steep, somewhat poorly drained and excessively drained soils that are sandy throughout

SOILS OF THE FLATWOODS

4	LEON–ORTEGA: Nearly level and gently sloping, moderately well drained and poorly drained soils that are sandy throughout
5	LEON–RIDGELAND–WESCONNETT: Nearly level, poorly drained and very poorly drained soils that are sandy throughout
6	PELHAM–MASCOTTE–SAPELO: Nearly level, poorly drained soils that are sandy to a depth of 20 inches or more and loamy below

SOILS OF THE HARDWOOD AND CYPRESS SWAMPS

7	WESCONNETT–MAUREPAS–STOCKADE: Level and nearly level, very poorly drained soils; some are sandy throughout, some are loamy within a depth of 20 inches, and others are organic

SOILS OF THE TIDAL MARSH

8	TISONIA: Level and nearly level, very poorly drained, saline, organic soils underlain by clayey materials

Compiled 1977

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF FLORIDA INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
AGRICULTURAL EXPERIMENT STATIONS, SOIL SCIENCE DEPARTMENT

GENERAL SOIL MAP

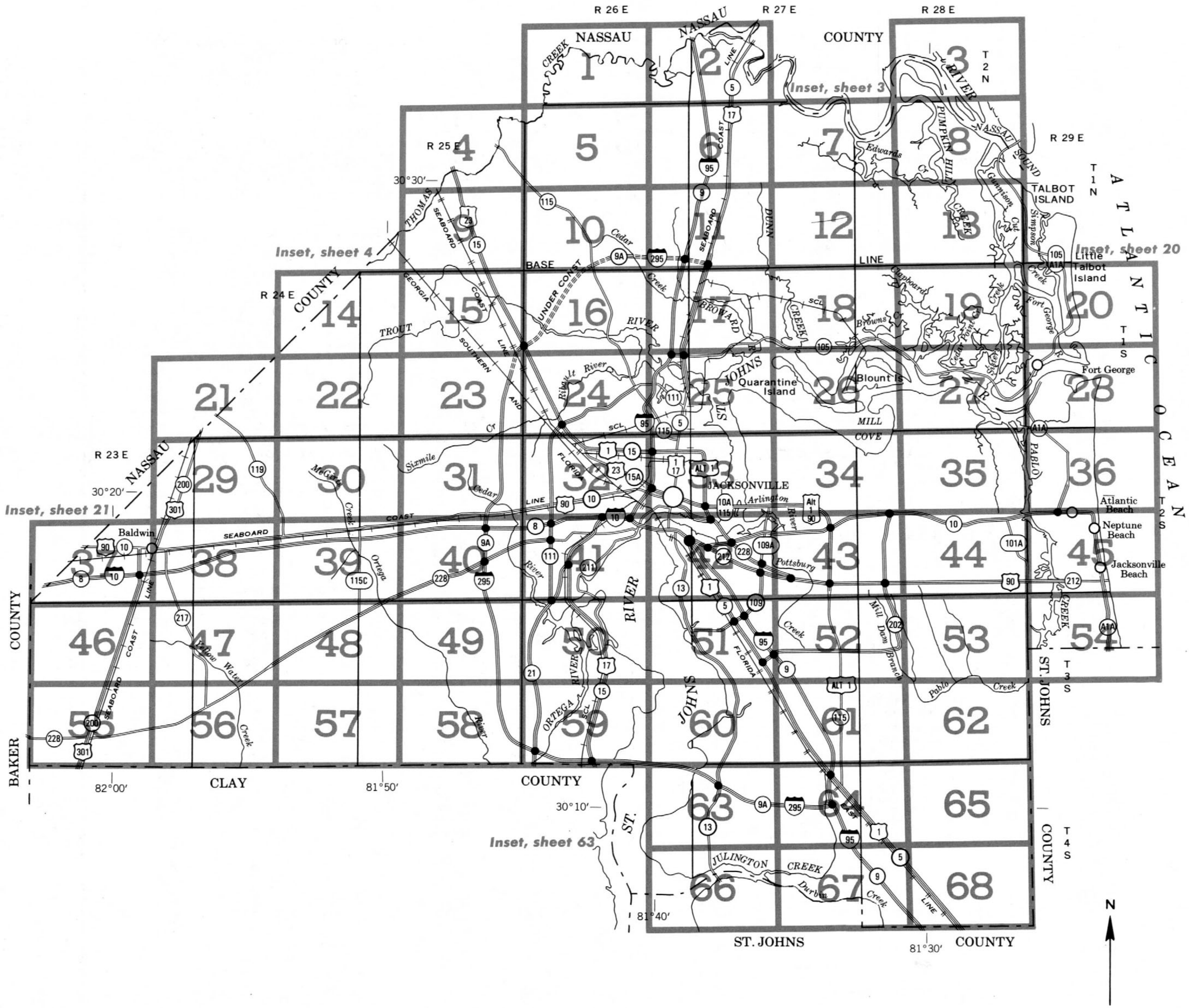
CITY OF JACKSONVILLE DUVAL COUNTY, FLORIDA

Scale 1:253,440

1 0 1 2 3 4 Miles

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

Original text from each map sheet:
"This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned."



INDEX TO MAP SHEETS

CITY OF JACKSONVILLE
DUVAL COUNTY, FLORIDA

Scale 1:253,440
1 0 1 2 3 4 Miles

SOIL LEGEND

Soil names followed by the superscript 1/ are broadly defined units. The composition of these units is more variable than that of the other units in the survey area, but has been controlled well enough to be interpreted for the expected use of the soils.

SYMBOL	NAME
1	Albany fine sand, 0 to 5 percent slopes
2	Alpin fine sand, 0 to 8 percent slopes
3	Aquic Quartzipsamments 1/
4	Arents 1/
5	Arents, sanitary landfill 1/
6	Beaches
7	Blanton fine sand, 0 to 5 percent slopes
8	Canaveral fine sand, 0 to 5 percent slopes
9	Cornelia fine sand, 0 to 5 percent slopes
10	Fripp fine sand, 2 to 8 percent slopes
11	Kershaw fine sand, 2 to 8 percent slopes
12	Kershaw-Urban land complex
13	Kershaw fine sand, smoothed 2/
14	Kureb fine sand, 2 to 8 percent slopes
15	Kureb fine sand, 8 to 20 percent slopes
16	Leon fine sand
17	Leon-Urban land complex
18	Lynn Haven fine sand
19	Mandarin fine sand
20	Mascotte fine sand
21	Mascotte-Urban land complex
22	Maurepas muck
23	Olustee fine sand
24	Ortega fine sand, 0 to 5 percent slopes
25	Pamlico muck
26	Pelham fine sand
27	Pelham-Urban land complex
28	Pits
29	Pottsburg fine sand
30	Ridgeland fine sand
31	Sapelo fine sand
32	Stockade fine sandy loam
33	Surrency fine sand
34	Tisonia mucky peat
35	Urban land
36	Wesconnett fine sand
37	Yonges fine sandy loam
38	Yulee clay

2/ The approved name is out of sequence but because map compilation is underway, no change was made in order that the map symbols could remain in numeric sequence.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- PIT
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CeA FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

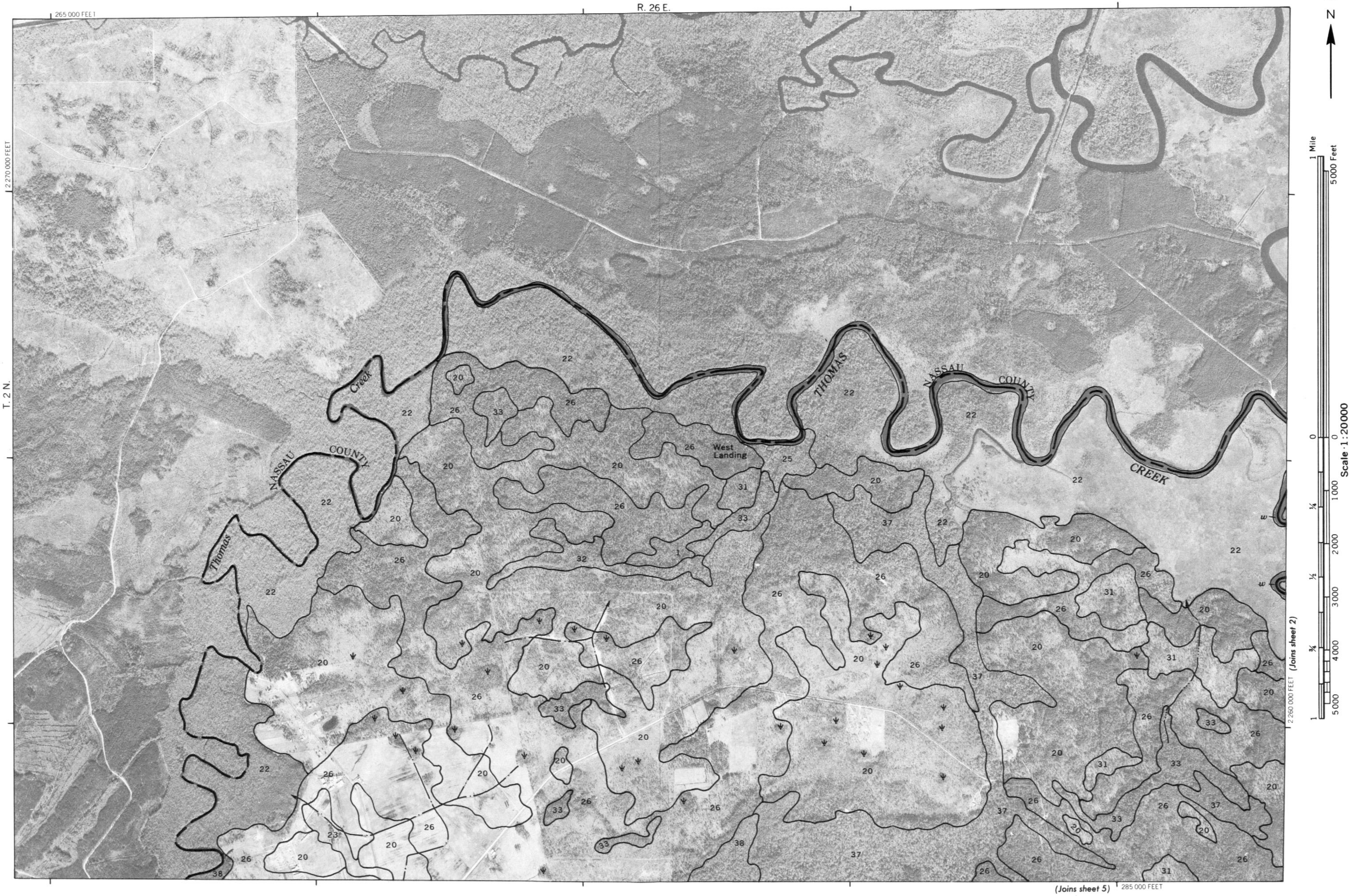
GULLY

DEPRESSION OR SINK

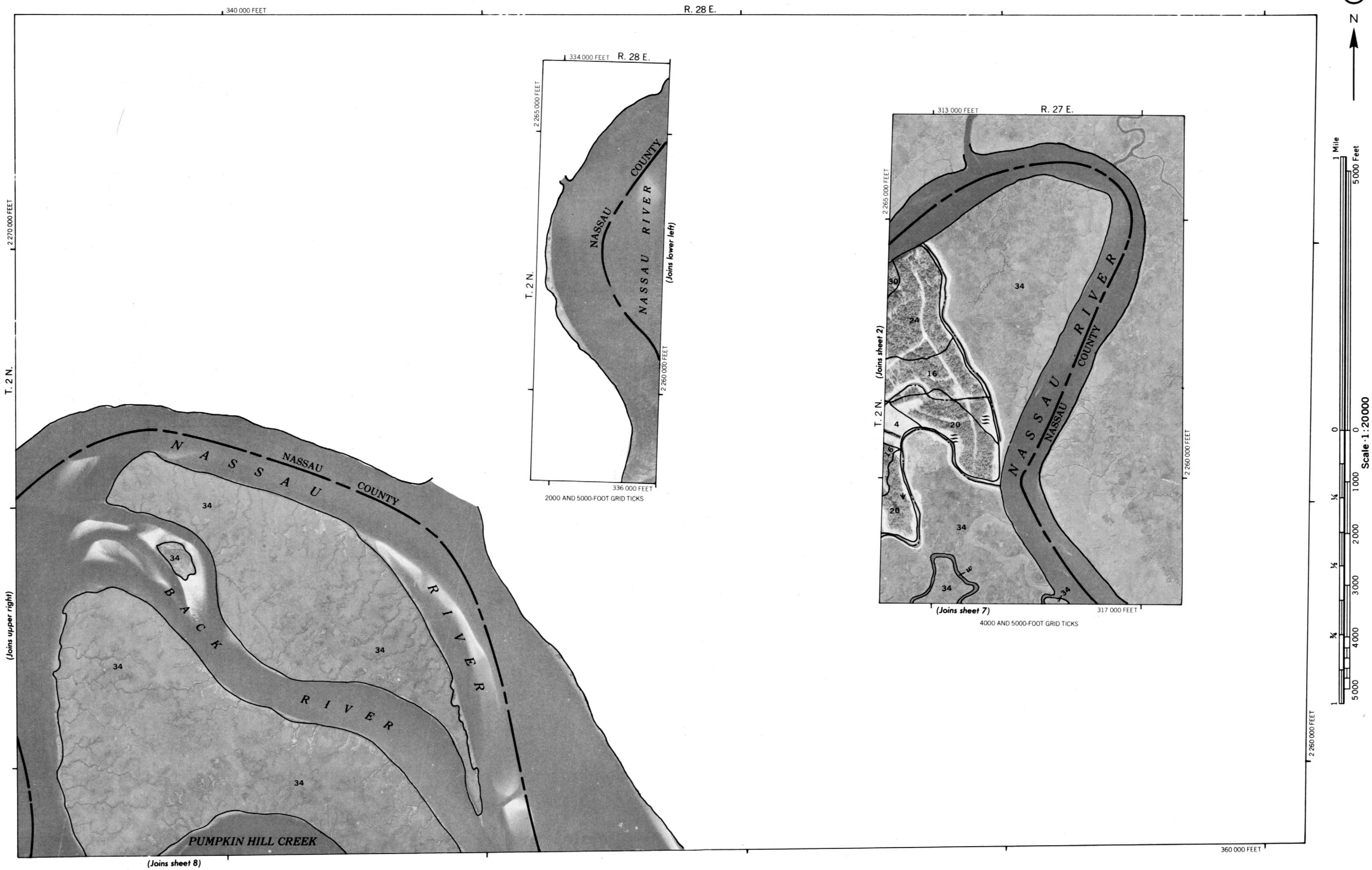
SOIL SAMPLE SITE (normally not shown) — S

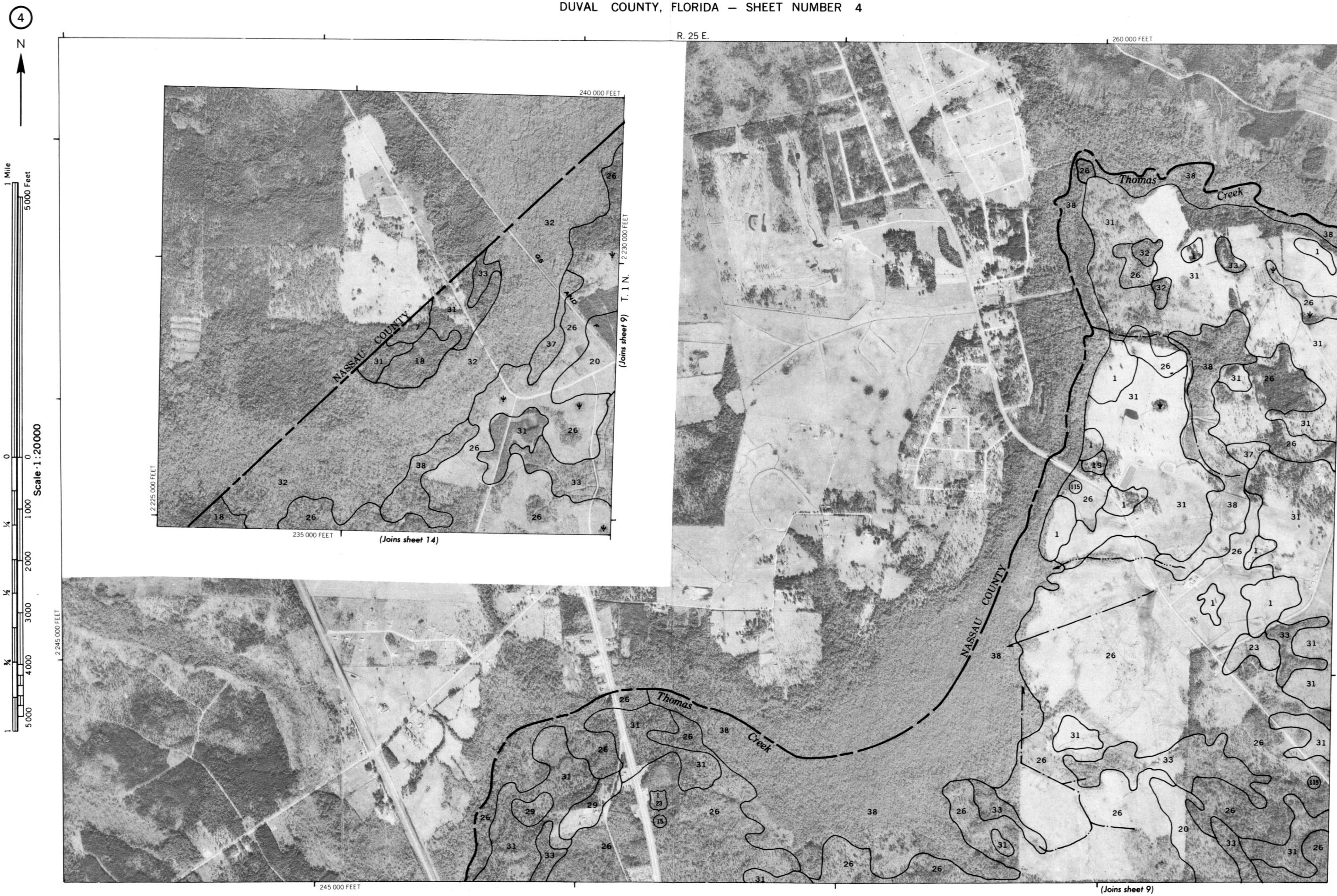
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot


R. 26 E.
T. 2 N.
265 000 FEET
2 270 000 FEET
2 260 000 FEET
285 000 FEET
(Joins sheet 2)
(Joins sheet 5)
NASSAU COUNTY
THOMAS CREEK
Thomas Creek
West Landing
N
1
Scale 1:20000
1 Mile
5000 Feet

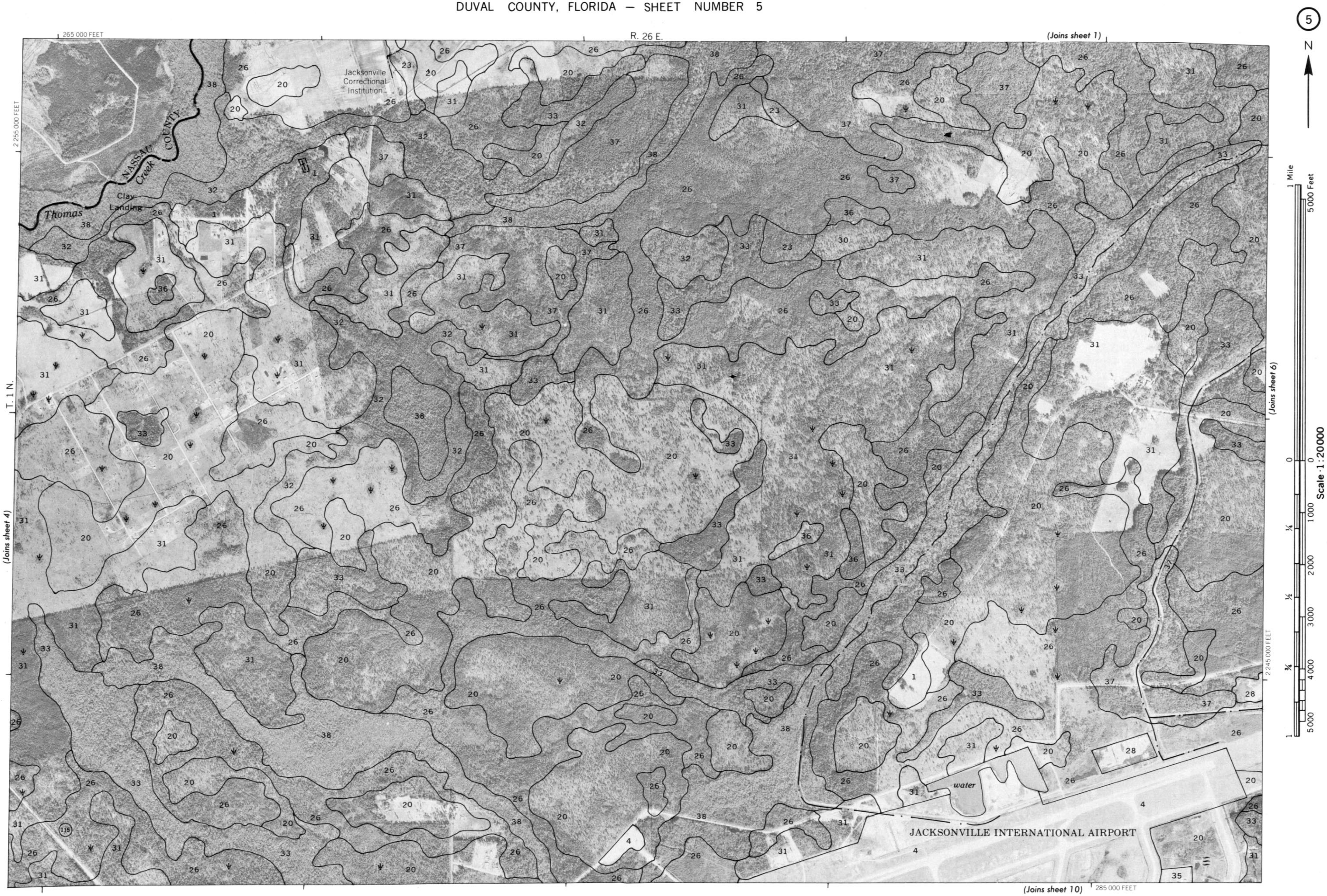

2
N
1 Mile
5000 Feet
Scale 1:20000
R. 26 E.
R. 27 E.
310 000 FEET
2 270 000 FEET
2 260 000 FEET
290 000 FEET
(Joins sheet 6)
(Joins sheet 1)
(Joins inset, sheet 3)
T. 2 N.
NASSAU RIVER
NASSAU COUNTY
THOMAS CREEK
Joels Landing
Seaton Landing
Halfmoon Island
Pearson Island
Inconstantion Creek
SEABOARD COAST LINE
water
95
9
17
5


340 000 FEET
R. 28 E.
2 270 000 FEET
T. 2 N.
(Joins upper right)
NASSAU RIVER
NASSAU COUNTY
BACK RIVER
PUMPKIN HILL CREEK
34
(Joins sheet 8)
360 000 FEET
2 260 000 FEET
334 000 FEET
R. 28 E.
2 265 000 FEET
2 260 000 FEET
336 000 FEET
(Joins lower left)
2000 AND 5000-FOOT GRID TICKS
313 000 FEET
R. 27 E.
2 265 000 FEET
(Joins sheet 2)
30
24
16
4
20
(Joins sheet 7)
317 000 FEET
4000 AND 5000-FOOT GRID TICKS
N
1 Mile
5 000 Feet
Scale 1:20000

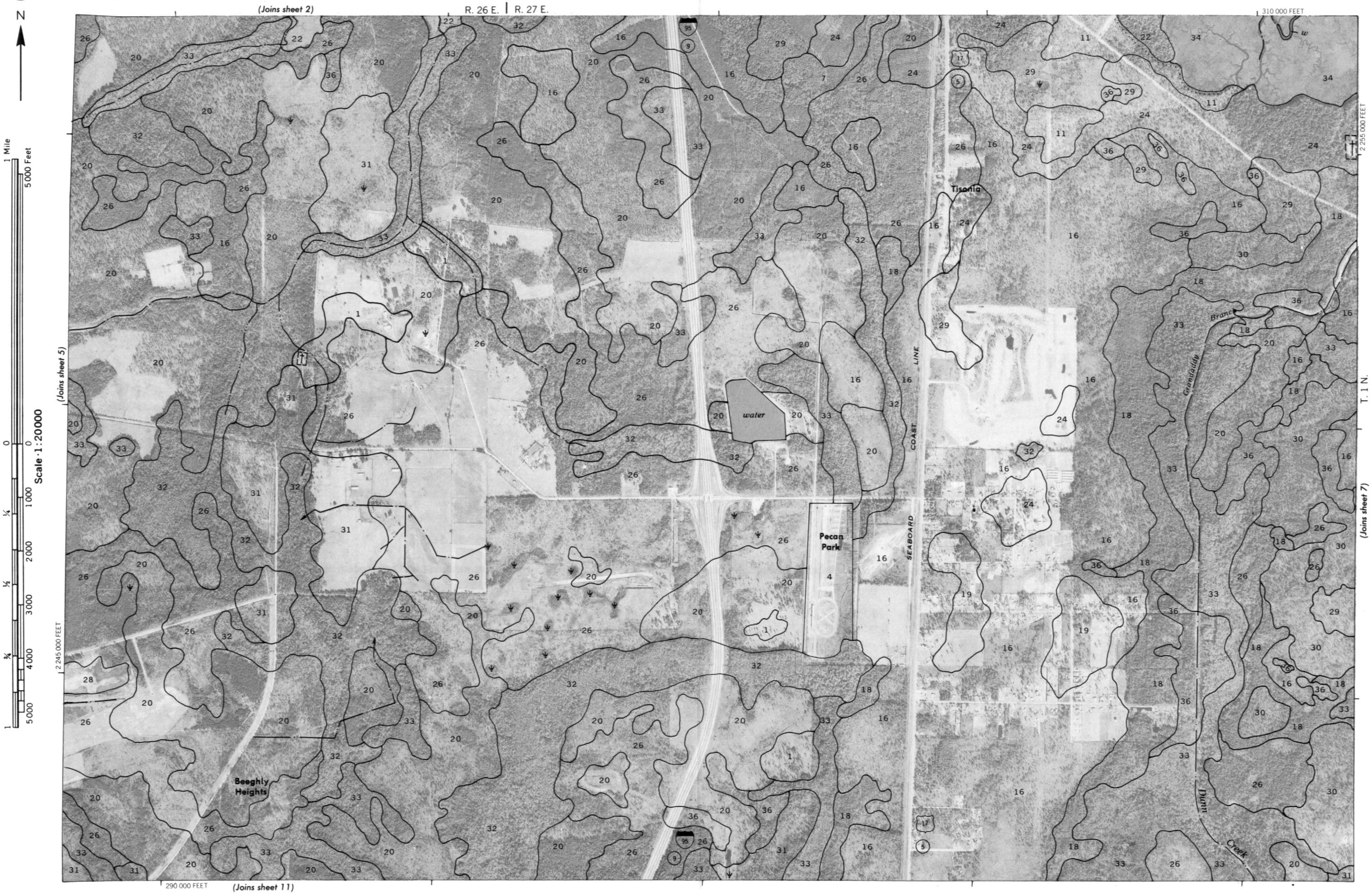


4
N
1 Mile
5000 Feet
Scale 1:20000
R. 25 E.
T. 1 N.
260 000 FEET
2 255 000 FEET
240 000 FEET
2 230 000 FEET
2 225 000 FEET
235 000 FEET
2 245 000 FEET
245 000 FEET
(Joins sheet 14)
(Joins sheet 9)
(Joins sheet 5)
NASSAU COUNTY
Thomas Creek

DUVAL COUNTY, FLORIDA — SHEET NUMBER 5

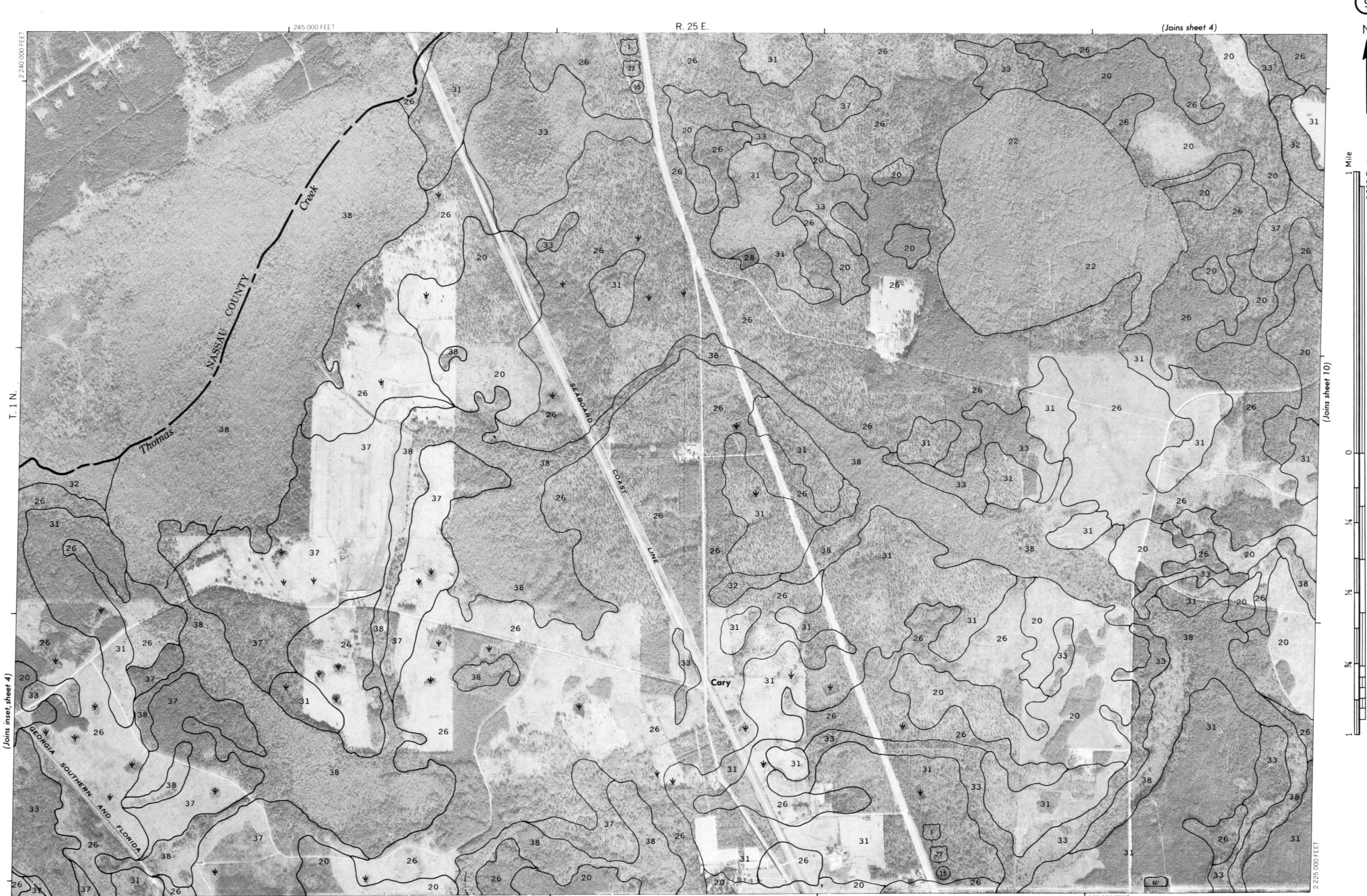


DUVAL COUNTY, FLORIDA — SHEET NUMBER 6

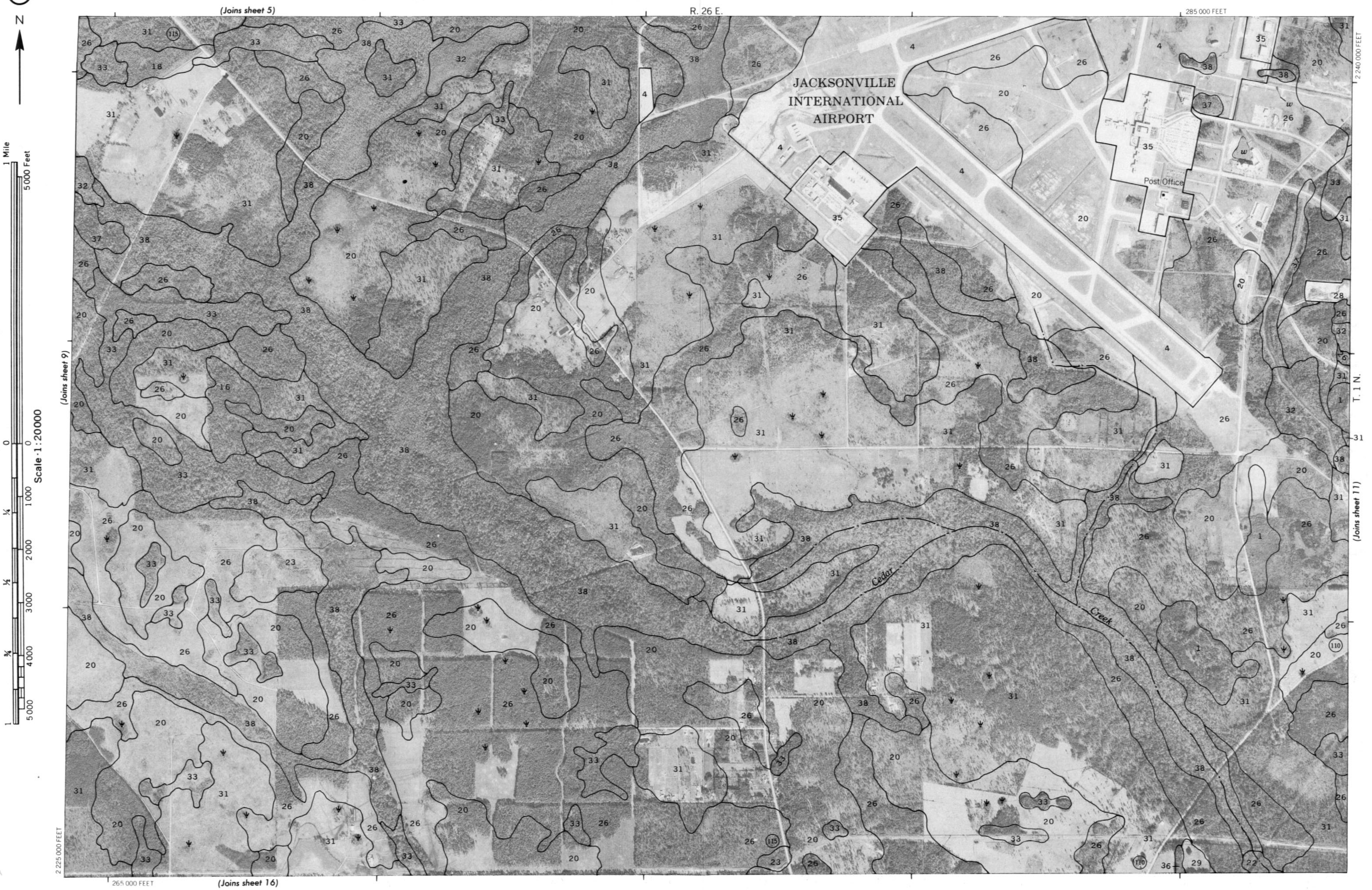


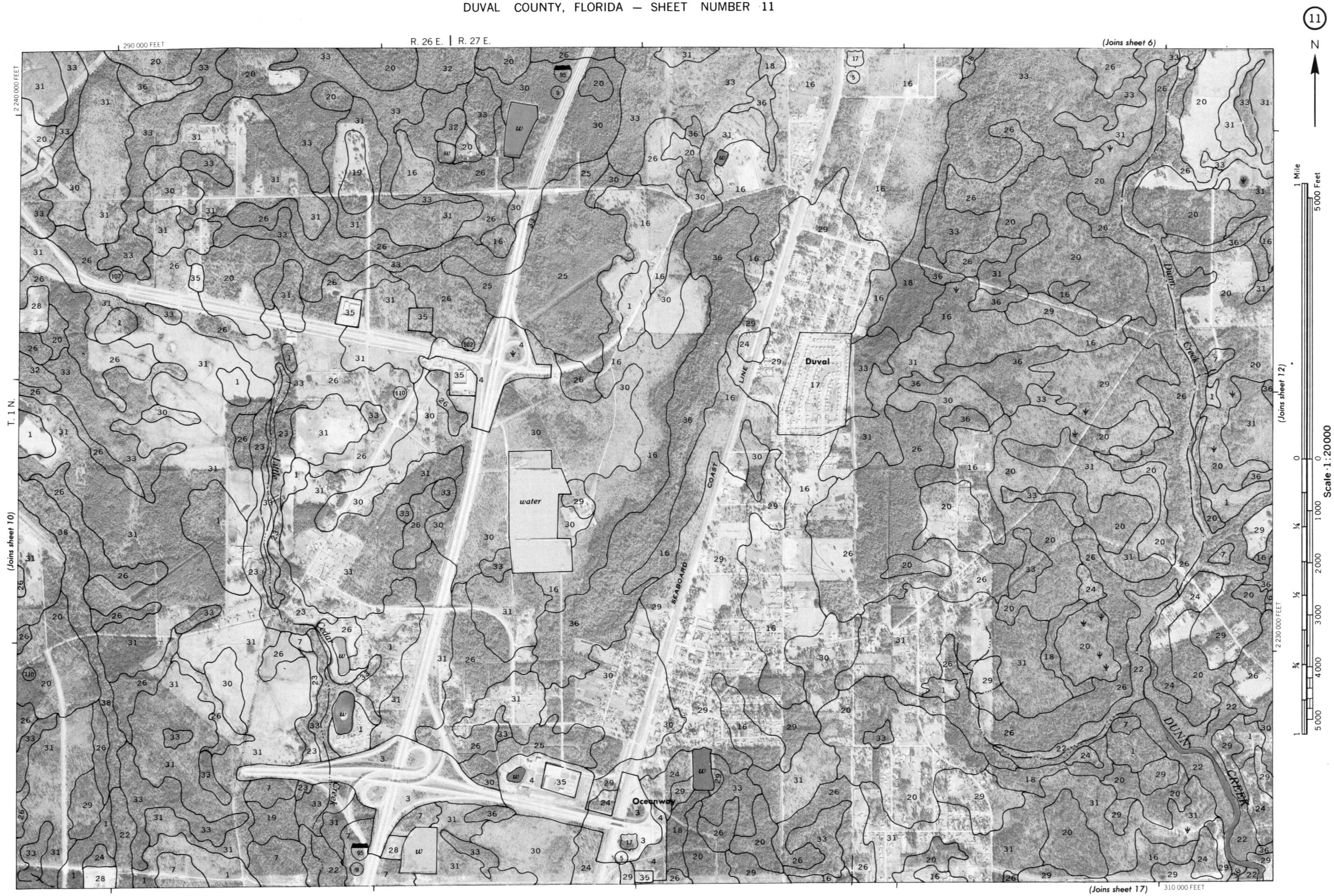
DUVAL COUNTY, FLORIDA — SHEET NUMBER 7

DUVAL COUNTY, FLORIDA — SHEET NUMBER 8


9
N
(Joins sheet 4)
R. 25 E.
245 000 FEET
2 240 000 FEET
T. 1 N.
Thomas Creek
NASSAU COUNTY
SEABOARD COAST LINE
GEORGIA SOUTHERN AND FLORIDA
Cary
(Joins sheet 10)
(Joins inset, sheet 4)
(Joins sheet 15)
260 000 FEET
2 225 000 FEET
1 Mile
5000 Feet
Scale 1:20000

DUVAL COUNTY, FLORIDA — SHEET NUMBER 10

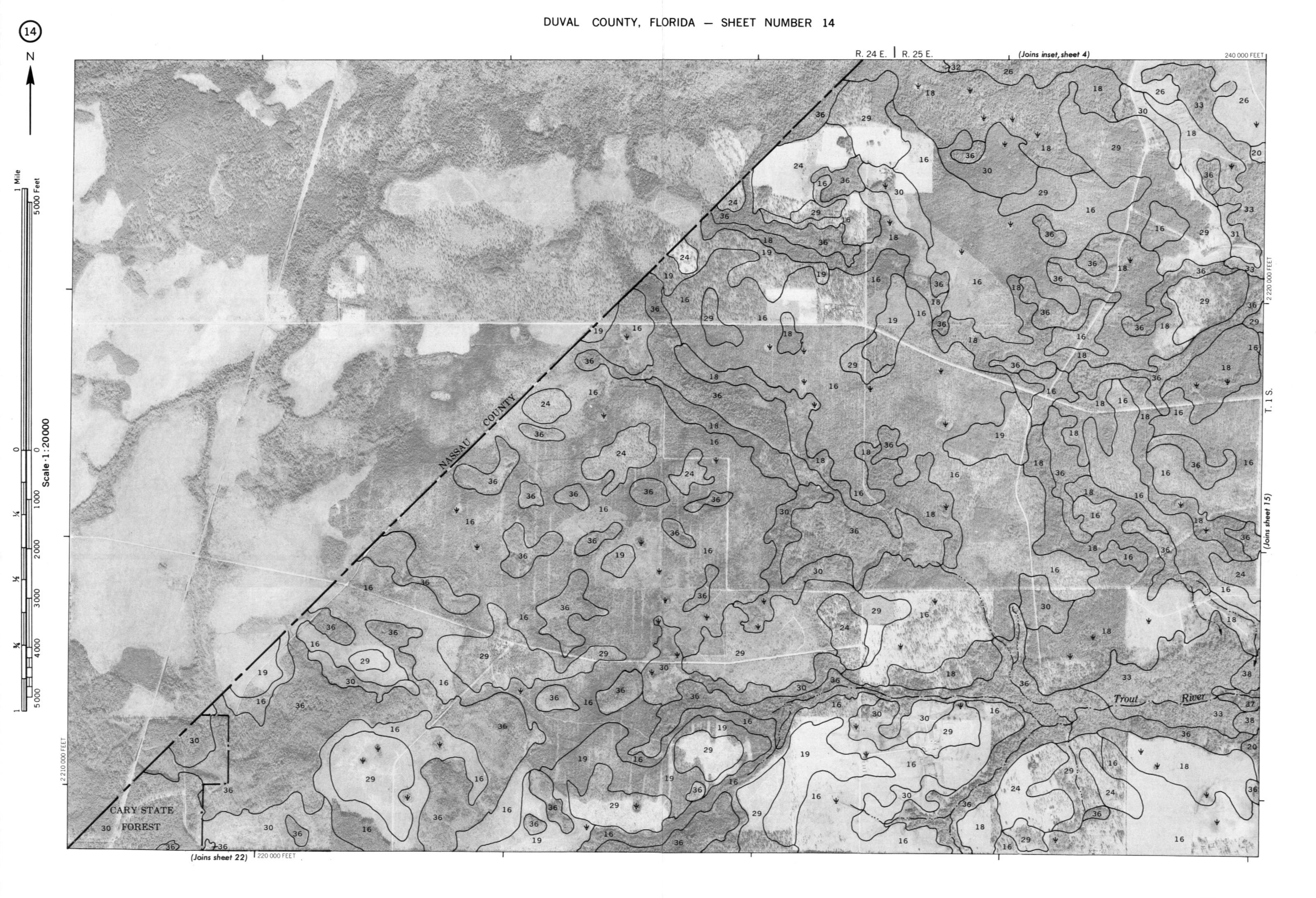



11
N
290 000 FEET
R. 26 E. | R. 27 E.
(Joins sheet 6)
2 240 000 FEET
T. 1 N.
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 17)
310 000 FEET
2 230 000 FEET
Duval
Oceanway
water
Little
Cedar
Creek
Dunn
Creek
DUNN
CREEK
SEABOARD
COAST
LINE
1 Mile
5000 Feet
Scale 1:20000

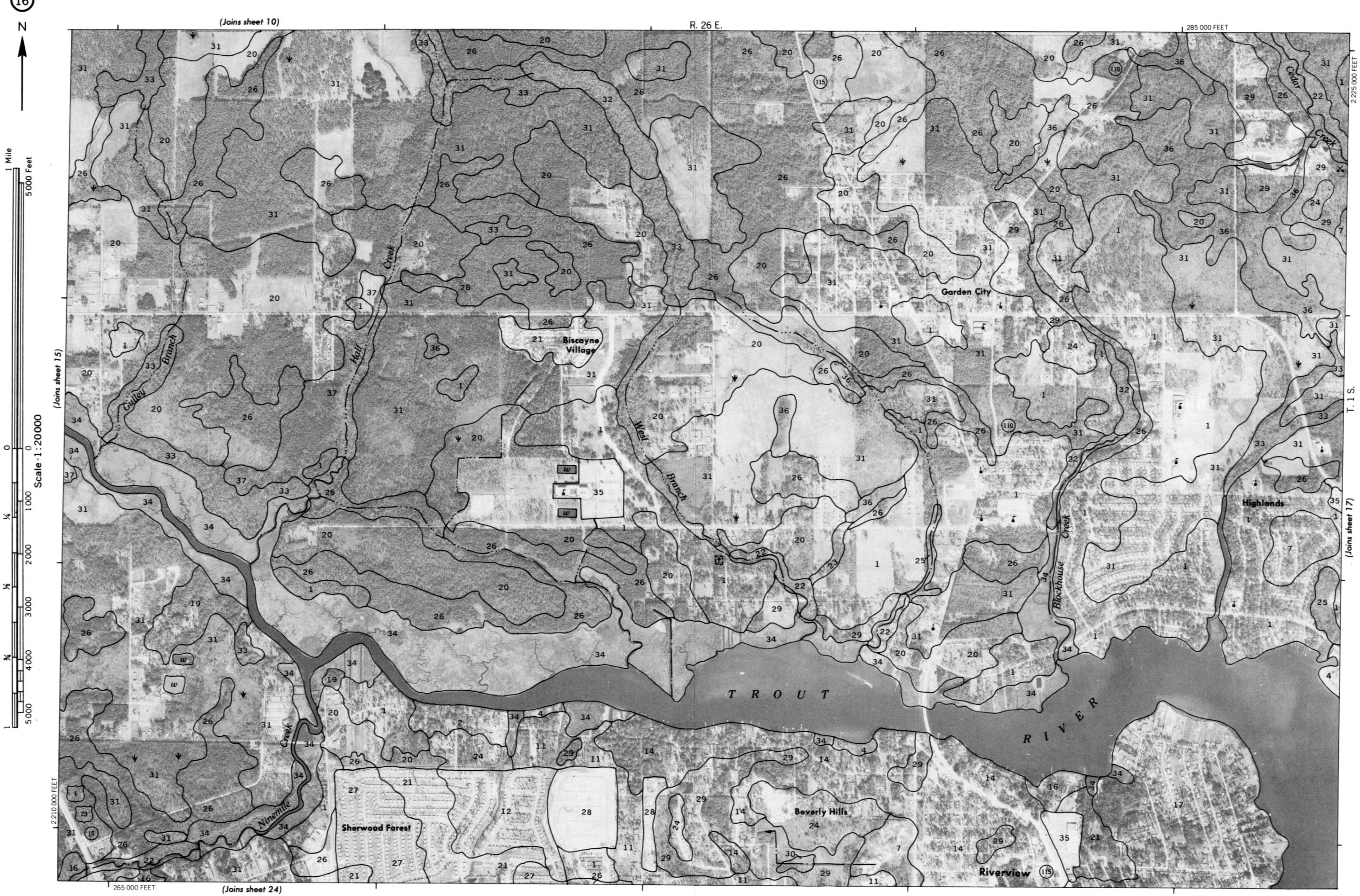
DUVAL COUNTY, FLORIDA — SHEET NUMBER 12


13
N
340 000 FEET
R. 28 E.
(Joins sheet 8)
2 240 000 FEET
T. 1 N.
(Joins sheet 12)
(Joins inset, sheet 20)
2 230 000 FEET
(Joins sheet 19)
360 000 FEET
Cabbage Hammock Swamp
PUMPKIN HILL CREEK
BLACK HAMMOCK ISLAND
SAWPIT CREEK
INTRACOASTAL
GUNNISON CUT
WATERWAY
BROWARD CREEK
TALBOT ISLAND
A1A
105
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000

DUVAL COUNTY, FLORIDA — SHEET NUMBER 14

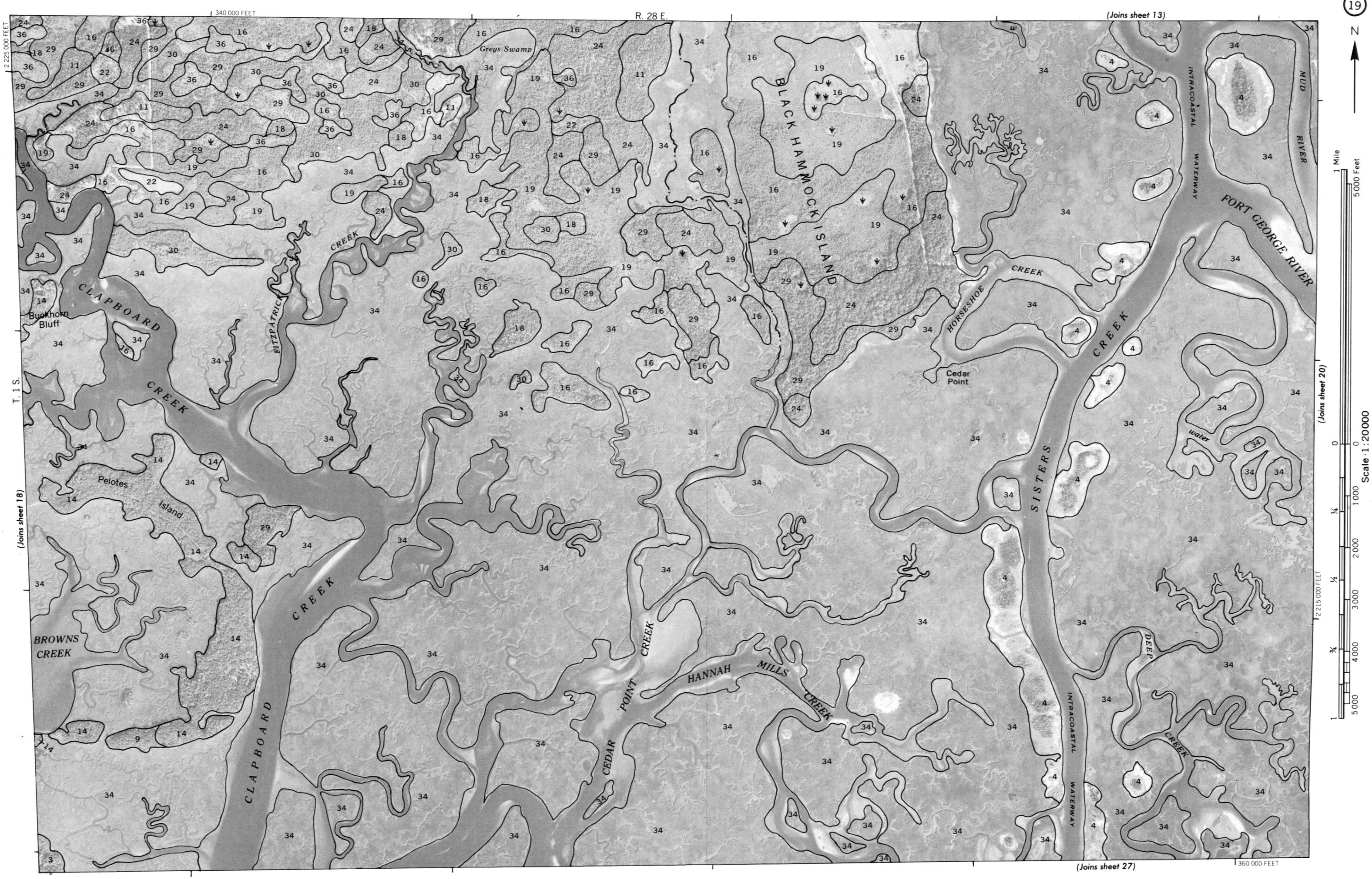


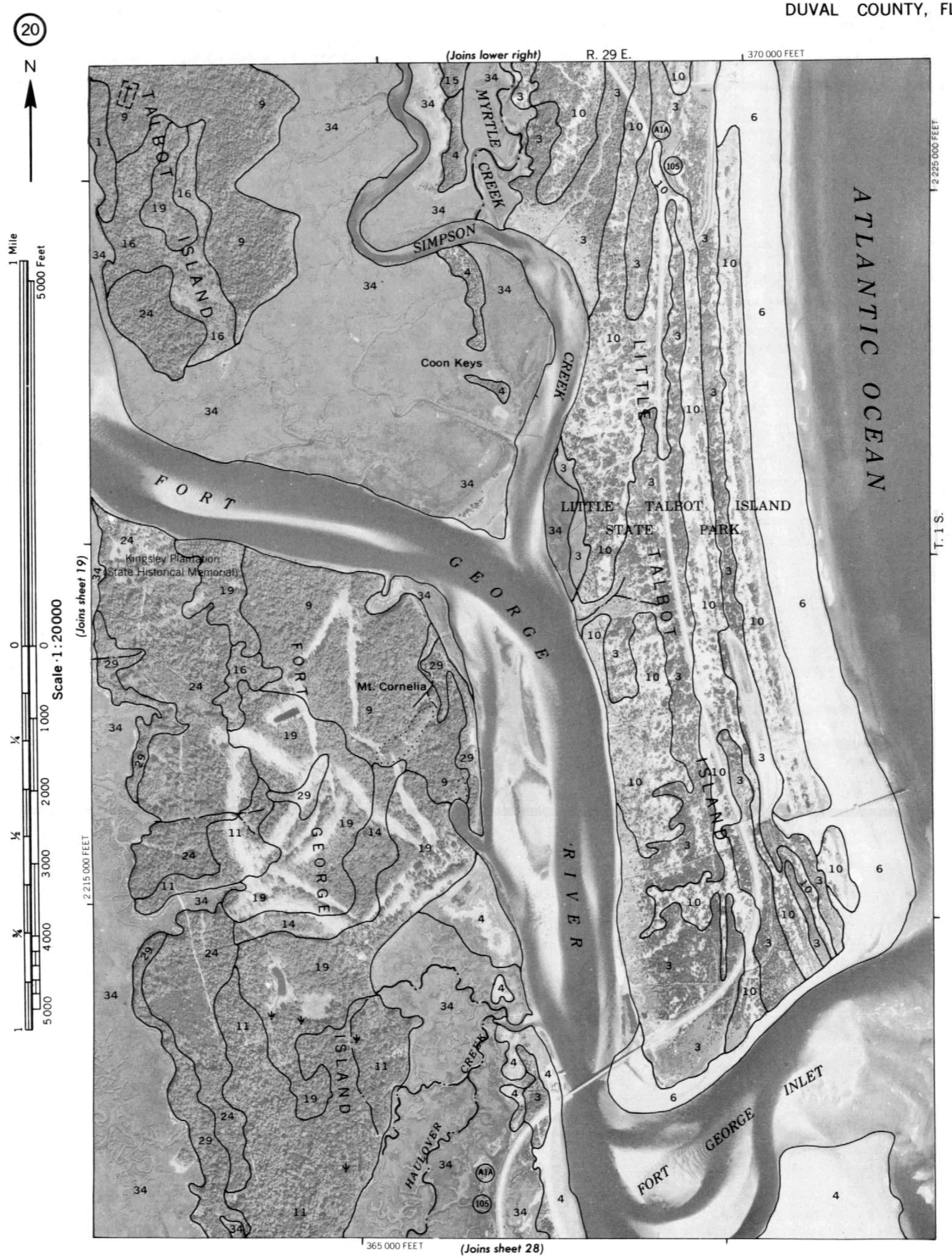
DUVAL COUNTY, FLORIDA — SHEET NUMBER 15

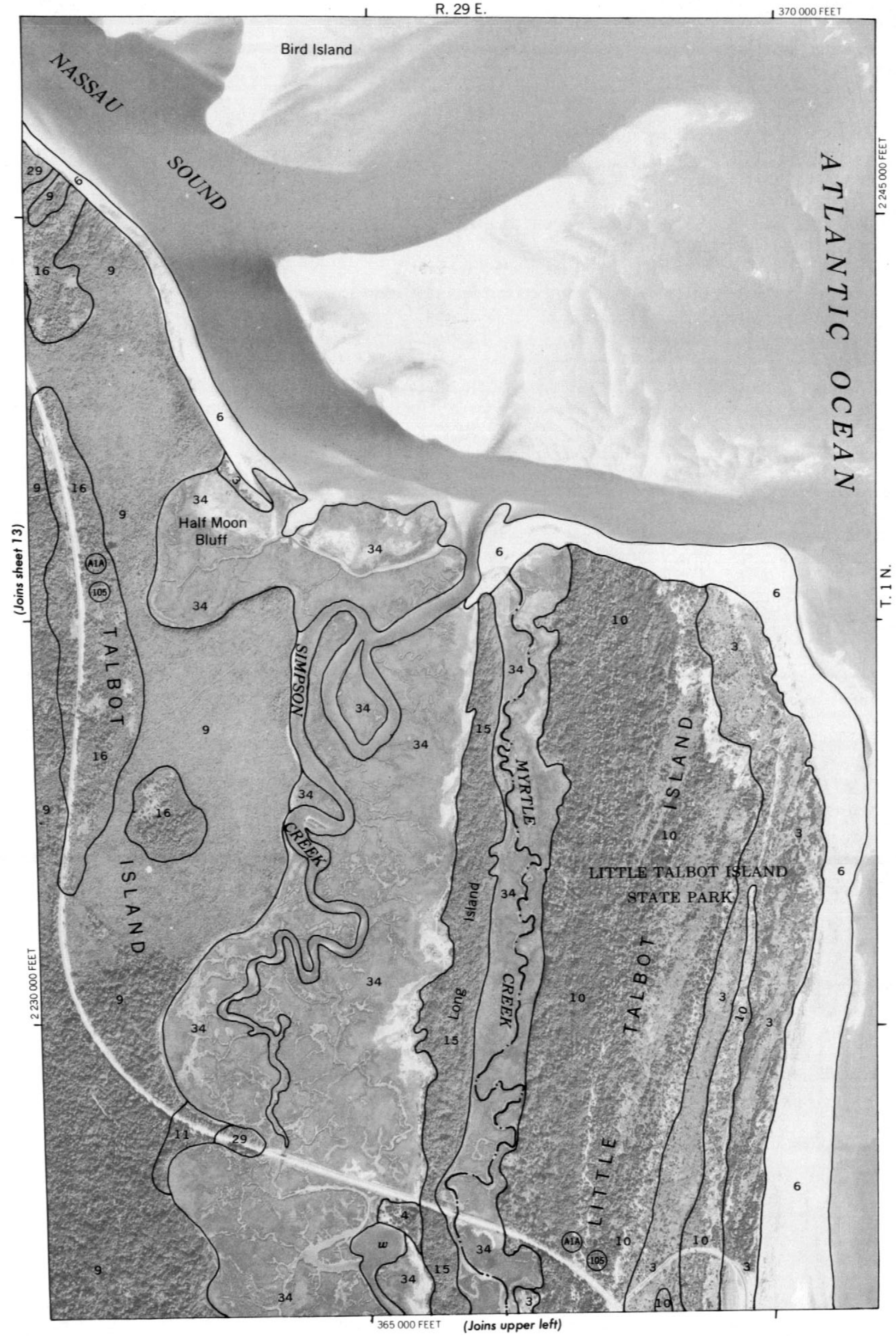

N
(Joins sheet 10)
R. 26 E.
285 000 FEET
2 225 000 FEET
T. 1 S.
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 24)
265 000 FEET
2 210 000 FEET
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
Garden City
Biscayne Village
Highlands
Sherwood Forest
Beverly Hills
Riverview
TROUT
RIVER
Gulley Branch
Hall Creek
West Branch
Blockhouse Creek
Cedar Creek
Ninemile Creek


17
N
290 000 FEET
R. 26 E.
R. 27 E.
(Joins sheet 11)
2 225 000 FEET
T. 1 S.
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 25)
310 000 FEET
2 210 000 FEET
1 Mile
5000 Feet
Scale 1:20000
Cedar Creek
Little Cedar Creek
Dunn Creek
San Mateo
Northwood
State Air National Guard
BROWARD RIVER
SEABOARD COAST LINE
Benbice
Highlands
JACKSONVILLE AIRPORT
Turner Pond
SANITARY LANDFILL
Holly Ford
TROUT RIVER
Quinlan
water
Eastport
OIL
GAS
Drummond Point

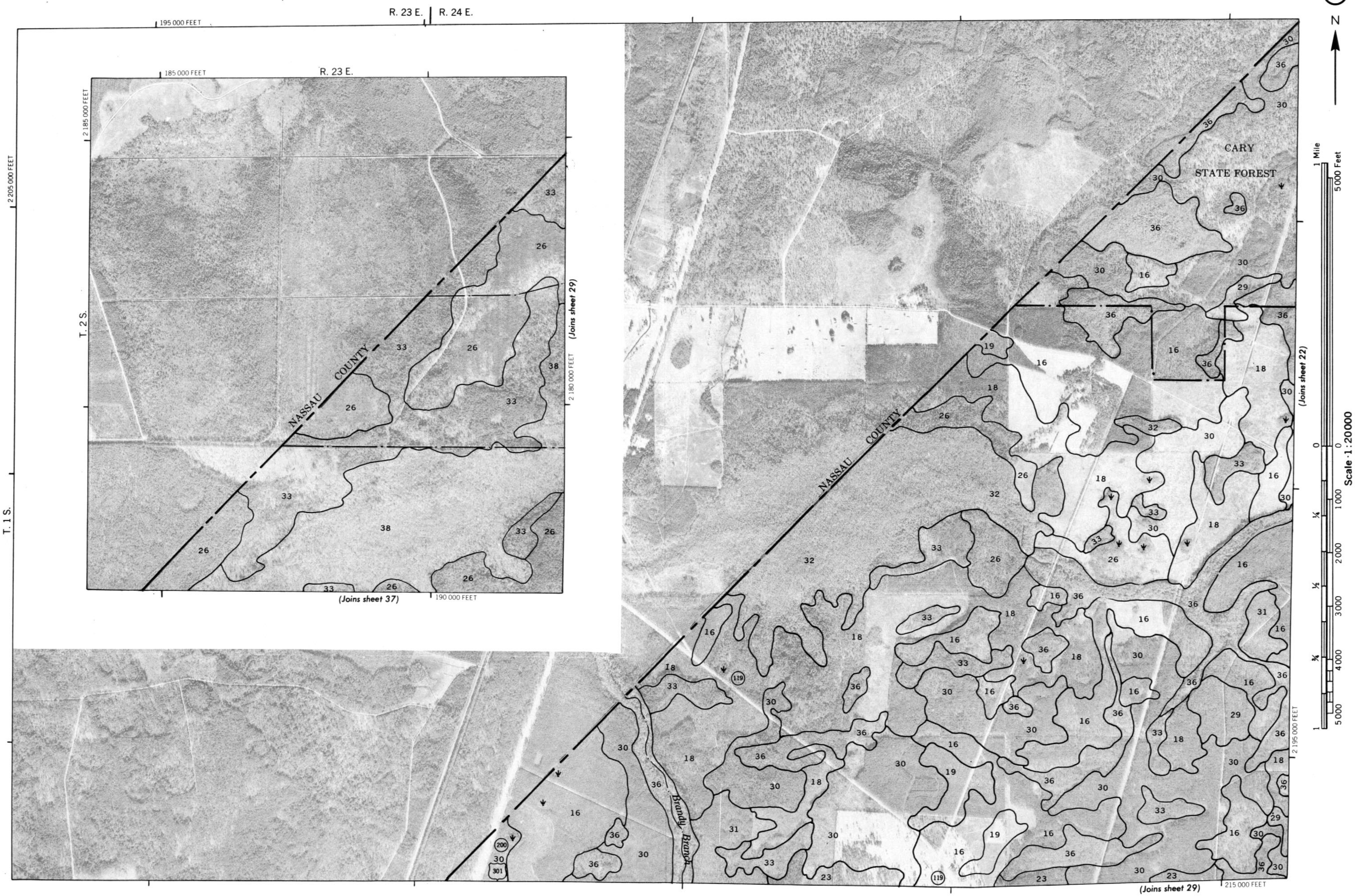
DUVAL COUNTY, FLORIDA — SHEET NUMBER 18


19
N
(Joins sheet 13)
(Joins sheet 18)
(Joins sheet 20)
(Joins sheet 27)
340 000 FEET
360 000 FEET
2 225 000 FEET
2 215 000 FEET
R. 28 E.
T. 1 S.
Scale 1:20000
1 Mile
5000 Feet
Greys Swamp
BLACK HAMMOCK ISLAND
CLAPBOARD CREEK
FITZPATRICK CREEK
CREEK
Buckhorn Bluff
Pelotes Island
BROWNS CREEK
CEDAR POINT CREEK
HANNAH MILLS CREEK
Cedar Point
HORSESHOE CREEK
SISTERS CREEK
INTRACOASTAL WATERWAY
FORT GEORGE RIVER
MUD RIVER
DEEP CREEK
water


20
N
Scale 1:20000
1 Mile
5000 Feet
(Joins lower right)
R. 29 E.
370 000 FEET
2 225 000 FEET
2 215 000 FEET
365 000 FEET
(Joins sheet 19)
(Joins sheet 28)
T. 1 S.
TALBOT ISLAND
MYRTLE CREEK
SIMPSON CREEK
Coon Keys
FORT GEORGE
LITTLE TALBOT ISLAND STATE PARK
LITTLE TALBOT ISLAND
Kingsley Plantation (State Historical Memorial)
Mt. Cornelia
FORT GEORGE ISLAND
FORT GEORGE RIVER
HAULOVER CREEK
FORT GEORGE INLET
ATLANTIC OCEAN


R. 29 E.
370 000 FEET
2 245 000 FEET
2 230 000 FEET
365 000 FEET
(Joins sheet 13)
(Joins upper left)
T. 1 N.
Bird Island
NASSAU SOUND
ATLANTIC OCEAN
Half Moon Bluff
TALBOT ISLAND
SIMPSON CREEK
MYRTLE CREEK
Long Island
LITTLE TALBOT ISLAND STATE PARK
LITTLE TALBOT ISLAND

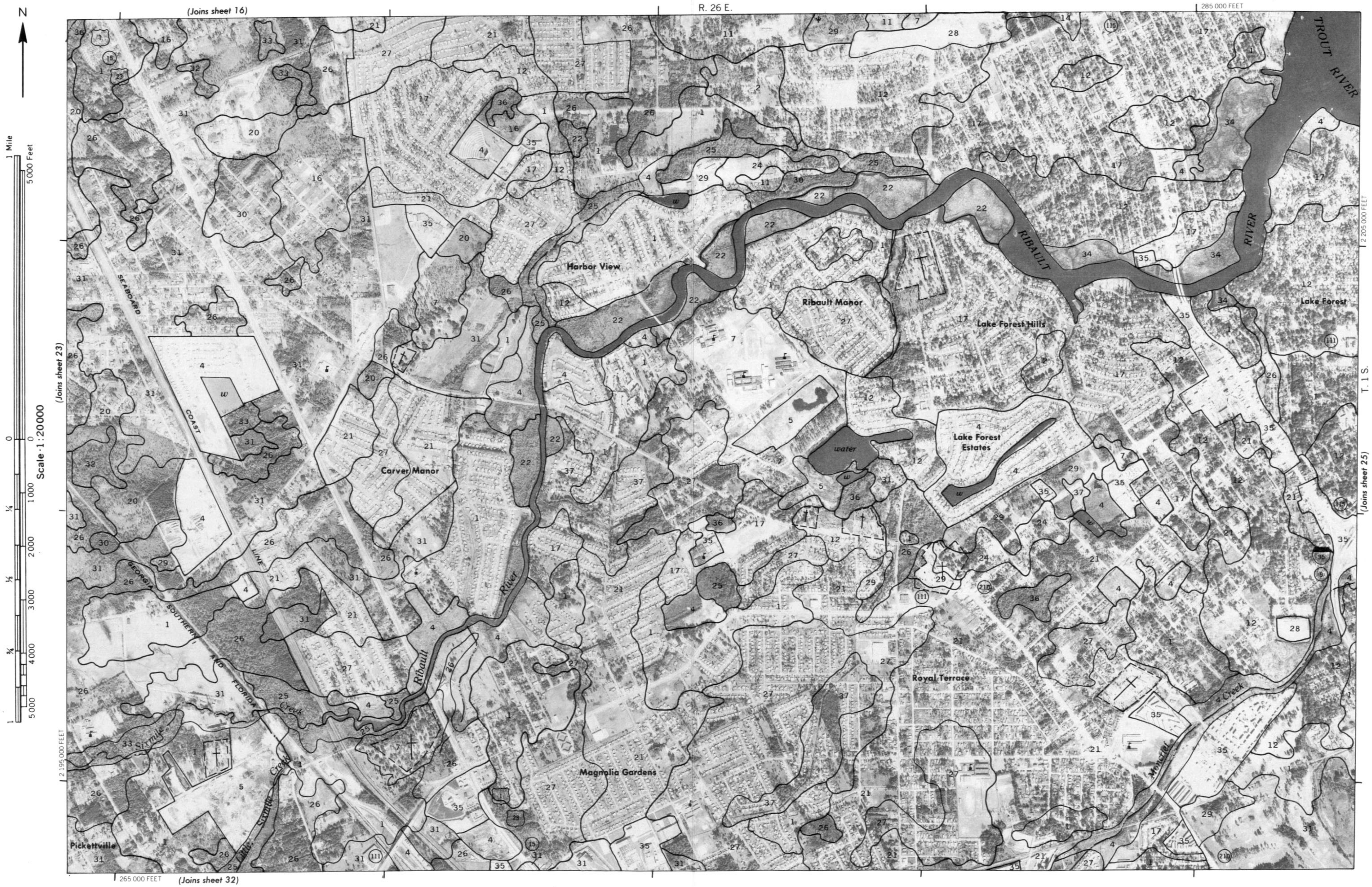
DUVAL COUNTY, FLORIDA — SHEET NUMBER 21



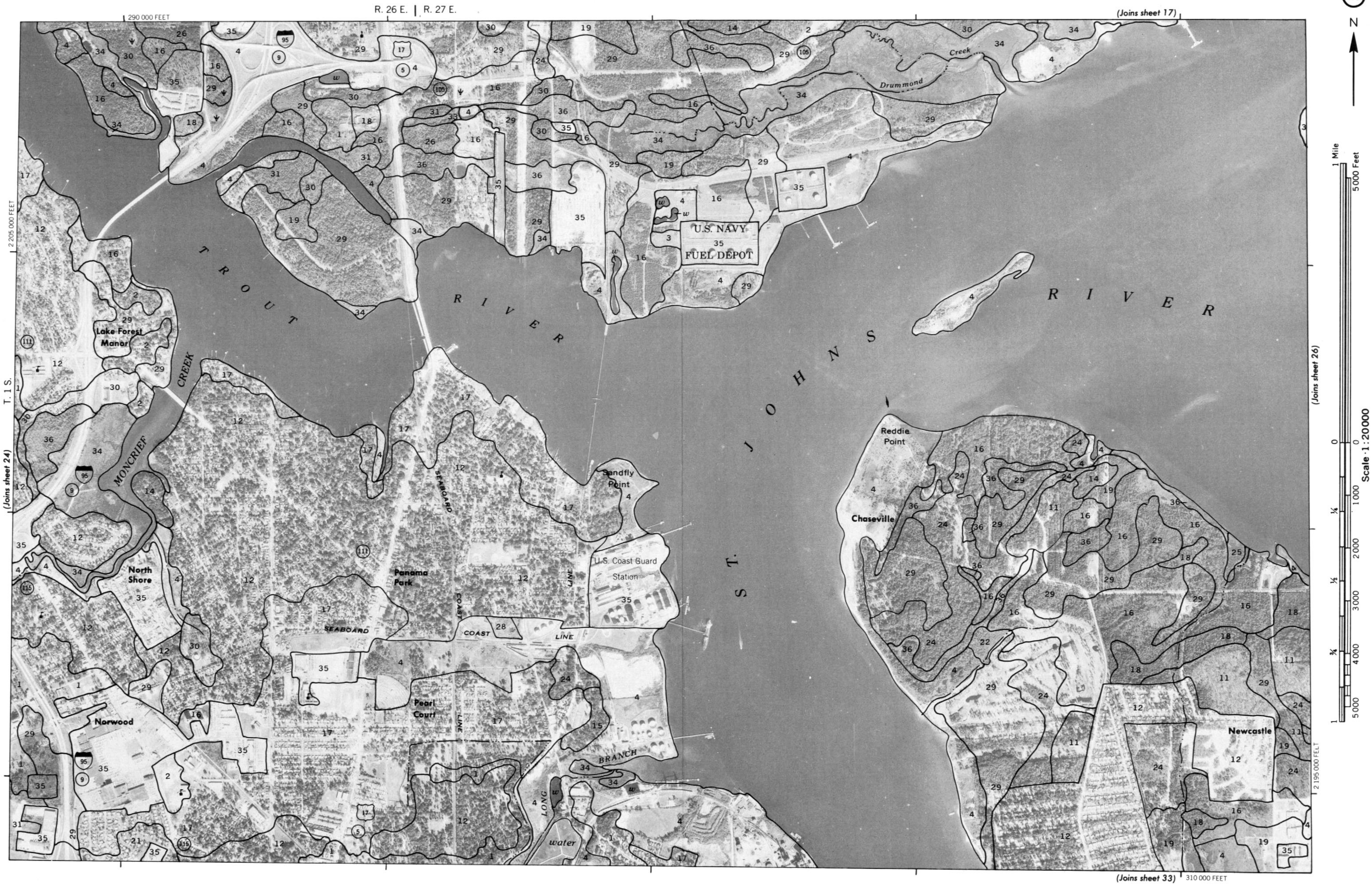
DUVAL COUNTY, FLORIDA — SHEET NUMBER 22


N
R. 25 E.
T. 1 S.
245 000 FEET
260 000 FEET
2 205 000 FEET
2 195 000 FEET
(Joins sheet 15)
(Joins sheet 24)
(Joins sheet 22)
(Joins sheet 31)
Kings Road
Pickettville
Sixmile Creek
GEORGIA SOUTHERN AND FLORIDA
SEABOARD COAST LINE
117
1 Mile
5000 Feet
Scale 1:20000
0
¼
½
¾
1
1000
2000
3000
4000
5000

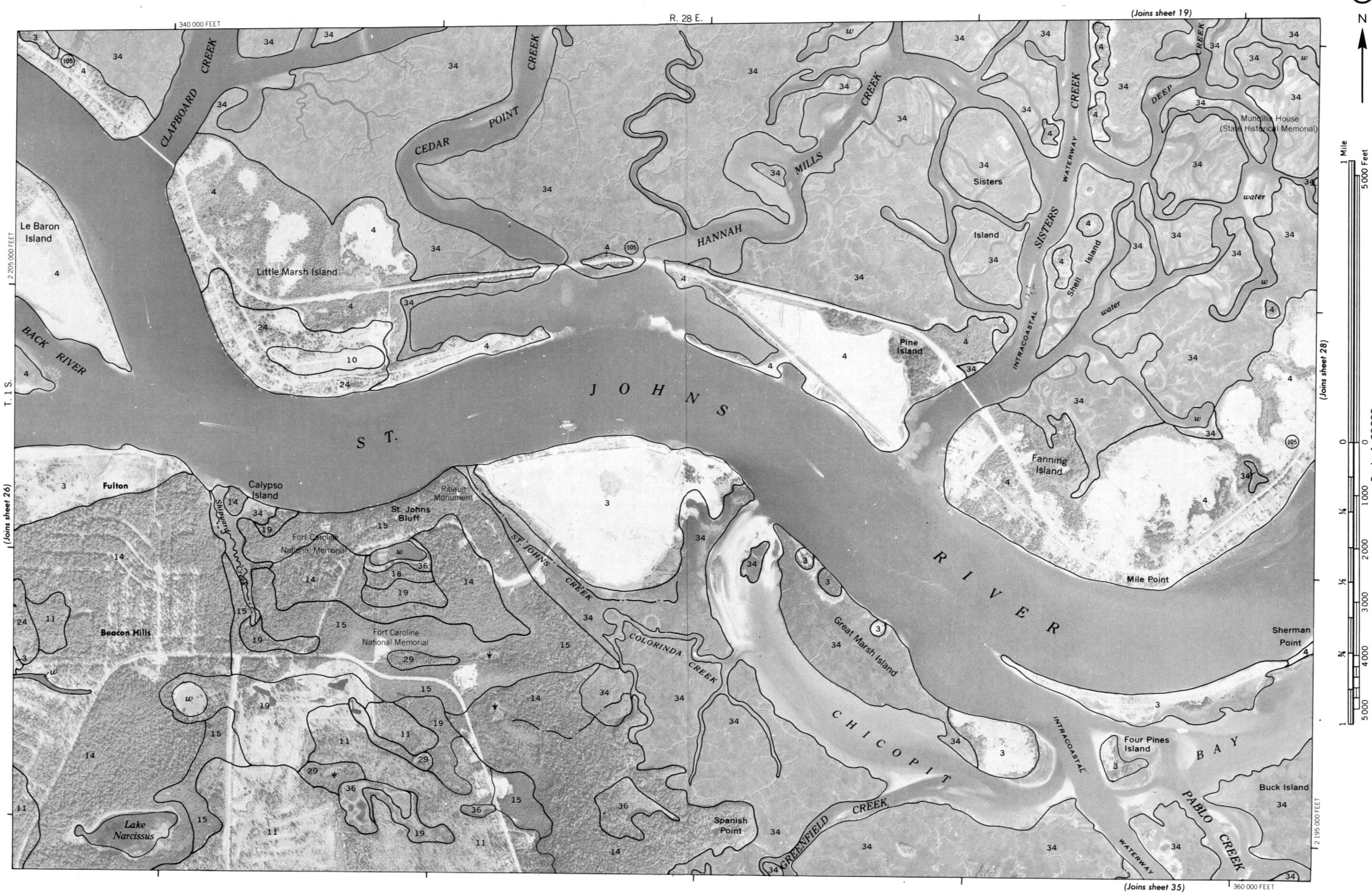
DUVAL COUNTY, FLORIDA — SHEET NUMBER 24

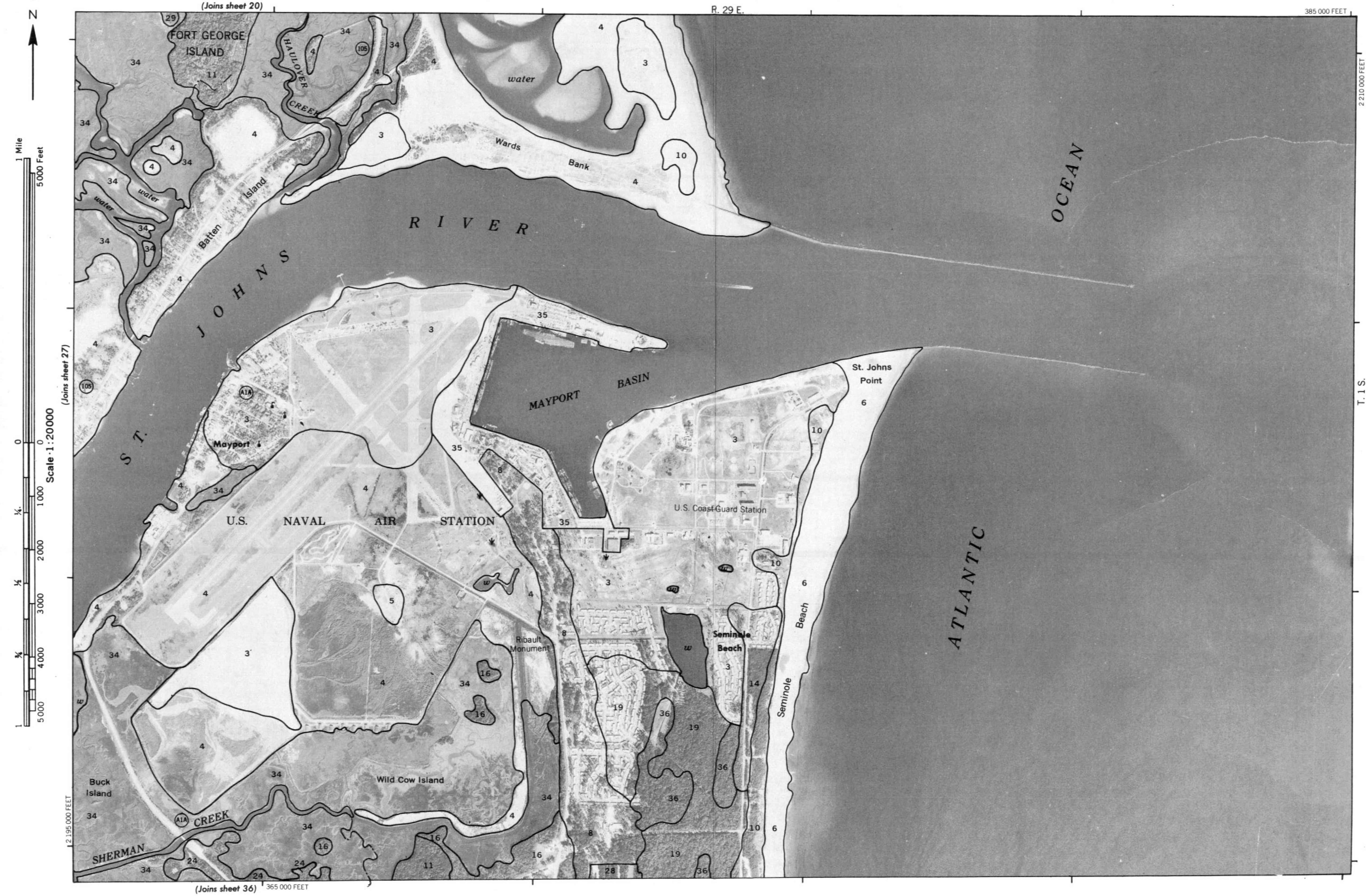


DUVAL COUNTY, FLORIDA — SHEET NUMBER 25



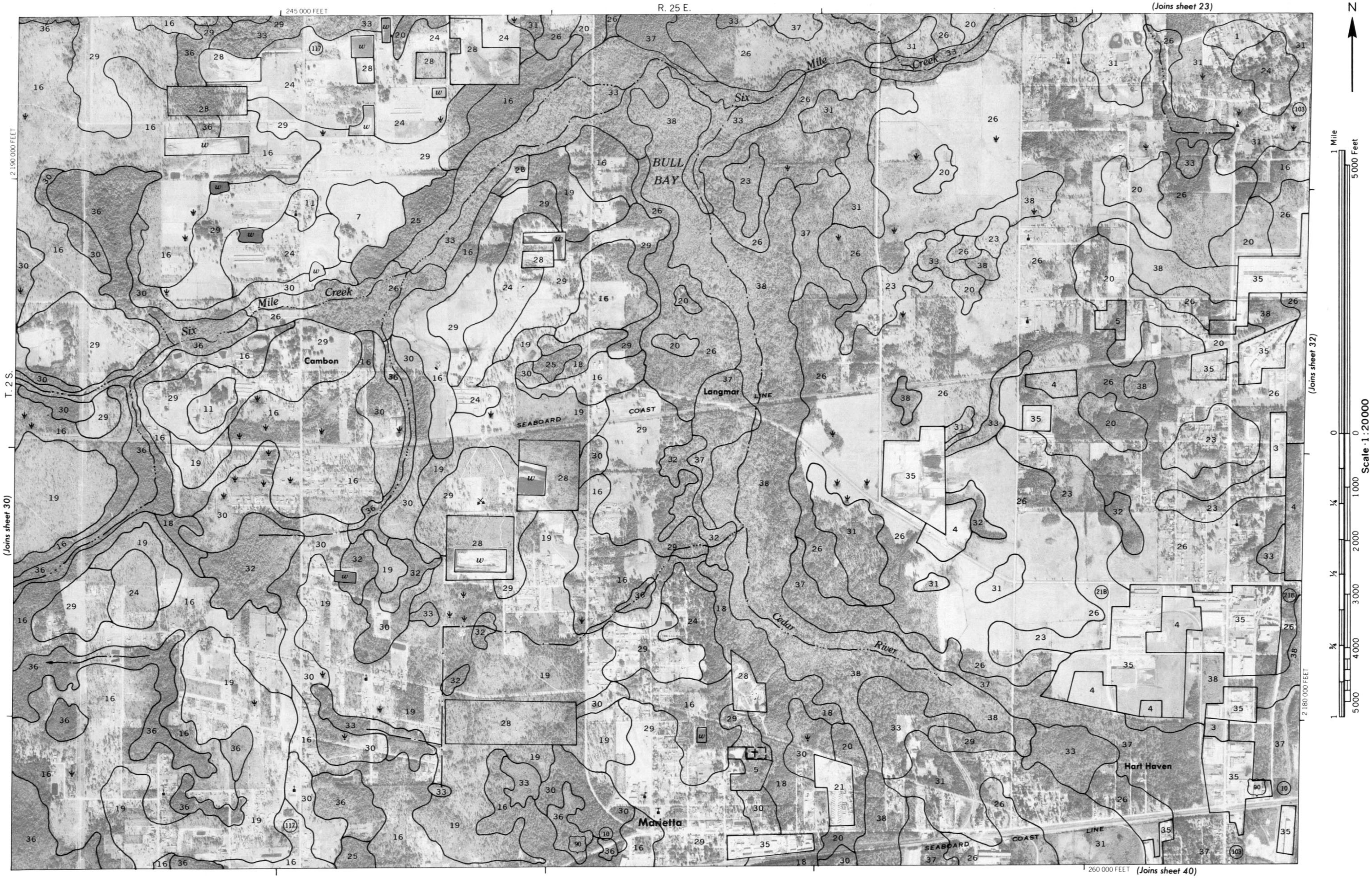

N
(Joins sheet 18)
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 34)
R. 27 E.
R. 28 E.
T. 1 S.
335 000 FEET
315 000 FEET
2 205 000 FEET
2 195 000 FEET
1 Mile
5000 Feet
Scale 1:20000
Quarantine Island
ST. JOHNS RIVER
NICHOLS CREEK
New Berlin
Dame Point Manor
Dame Point
Vicks Island
Le Baron Island
BACK RIVER
water
Coon Point
Alligator Island
Blount Island
ALLIGATOR CREEK
Crab Island
William Island
Randolf Island
New Castle Island
Fip Island
Pauline Island
Marian Island
Reed Island
Newcastle Creek
Mitchell Bluff
MILL COVE


27
N
340 000 FEET
R. 28 E.
(Joins sheet 19)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 35)
360 000 FEET
2 205 000 FEET
2 195 000 FEET
T. 1 S.
CLAPBOARD CREEK
CEDAR POINT CREEK
HANNAH MILLS CREEK
DEEP CREEK
Mungillia House
(State Historical Memorial)
Sisters Island
SISTERS CREEK
INTRACOASTAL WATERWAY
Shell Island
water
Le Baron Island
Little Marsh Island
BACK RIVER
Pine Island
ST. JOHNS RIVER
Fanning Island
Fulton
Calypso Island
Shipyard Creek
Ribault Monument
St. Johns Bluff
Fort Caroline National Memorial
ST. JOHNS CREEK
COLORINDA CREEK
Mile Point
Sherman Point
Great Marsh Island
Beacon Hills
CHICOPIT BAY
Four Pines Island
Buck Island
PABLO CREEK
GREENFIELD CREEK
Spanish Point
Lake Narcissus
1 Mile
5000 Feet
Scale 1:20000

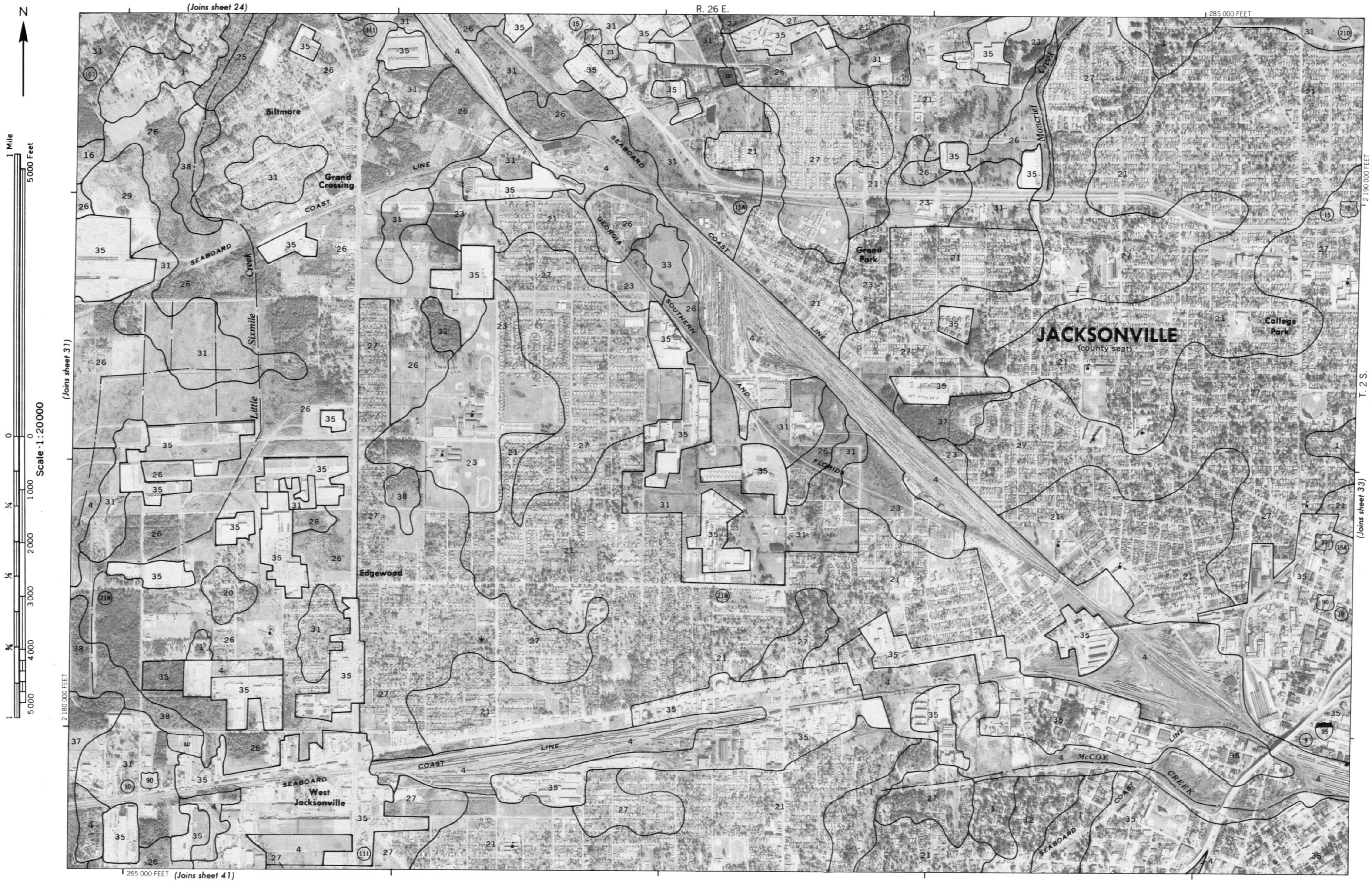

28
N
(Joins sheet 20)
(Joins sheet 27)
(Joins sheet 36)
R. 29 E.
T. 1 S.
385 000 FEET
2 210 000 FEET
2 195 000 FEET
365 000 FEET
Scale 1:20000
1 Mile
5000 Feet
FORT GEORGE ISLAND
HAULOVER CREEK
Batten Island
Wards Bank
water
ST. JOHNS RIVER
OCEAN
ATLANTIC
Mayport
MAYPORT BASIN
St. Johns Point
U.S. Coast Guard Station
U.S. NAVAL AIR STATION
Ribault Monument
Seminole Beach
Seminole Beach
Wild Cow Island
Buck Island
SHERMAN CREEK

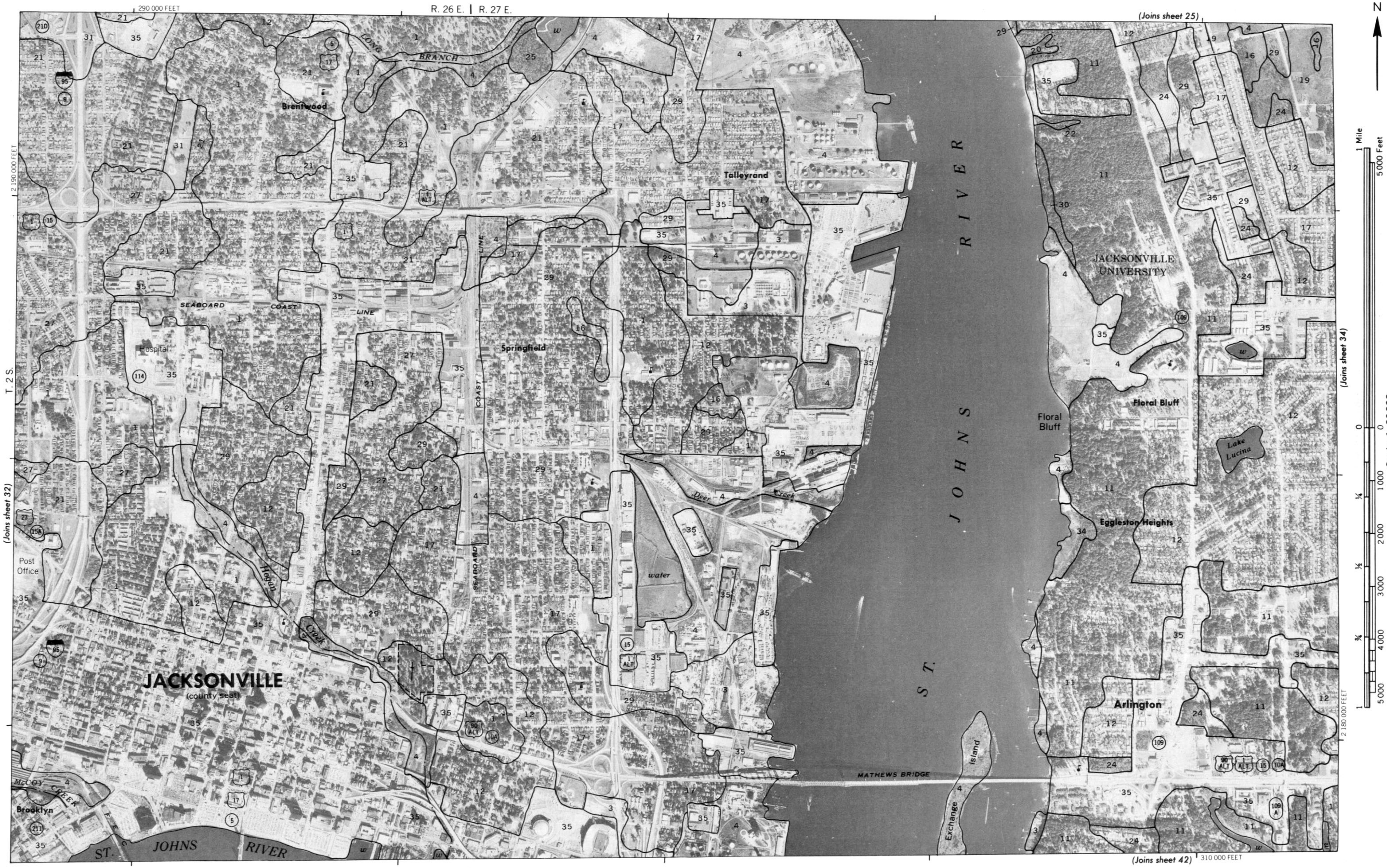

29
N
R. 23 E.
R. 24 E.
195 000 FEET
2 190 000 FEET
2 180 000 FEET
215 000 FEET
(Joins sheet 21)
(Joins sheet 30)
(Joins sheet 38)
(Joins inset, sheet 21)
T. 2 S.
Tulane
NASSAU COUNTY
SEABOARD COAST LINE
Brandy Branch
1 Mile
5000 Feet
Scale 1:20000

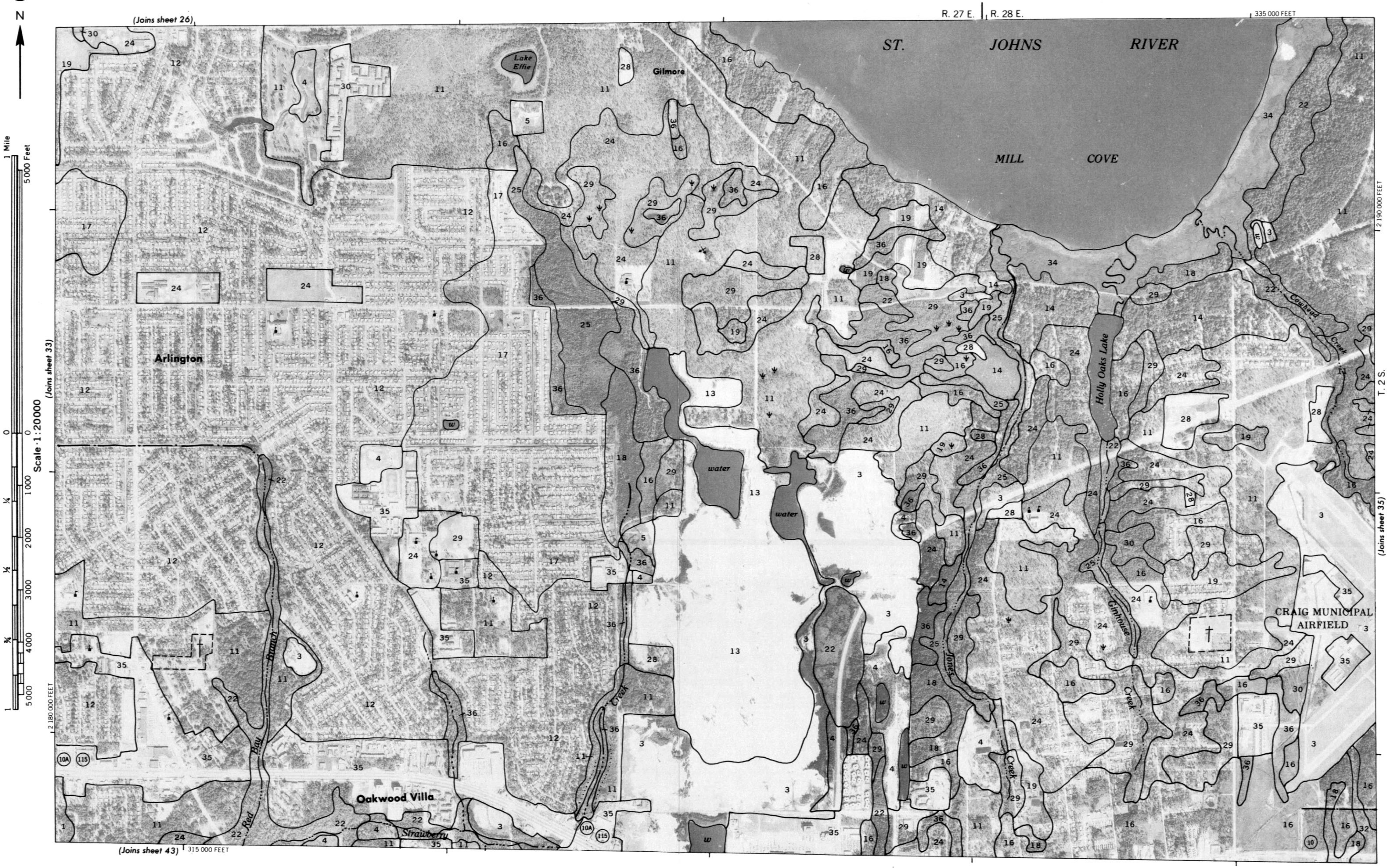

N
(Joins sheet 22)
R. 24 E. | R. 25 E.
240 000 FEET
2 190 000 FEET
T. 2 S.
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 39)
220 000 FEET
2 180 000 FEET
U.S.N. RES.
WHITEHOUSE FIELD
SEABOARD
COAST
LINE
McGirts
Creek
Six
Mile
Creek
Mandeville
119
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1


245 000 FEET
R. 25 E.
(Joins sheet 23)
N
2 190 000 FEET
T. 2 S.
(Joins sheet 30)
(Joins sheet 32)
2 180 000 FEET
260 000 FEET
(Joins sheet 40)
1 Mile
5000 Feet
Scale 1:20000
Six Mile Creek
BULL BAY
Cambon
Langmar
SEABOARD COAST LINE
Cedar River
Hart Haven
Marietta

(32)


N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 24)
R. 26 E.
285 000 FEET
2 190 000 FEET
T. 2 S.
(Joins sheet 31)
(Joins sheet 33)
2 180 000 FEET
265 000 FEET
(Joins sheet 41)
Biltmore
Grand Crossing
Sixmile Creek
Little
Edgewood
West Jacksonville
Grand Park
Moncrief Creek
JACKSONVILLE
(county seat)
College Park
SEABOARD COAST LINE
GEORGIA SOUTHERN AND FLORIDA
McCOY CREEK

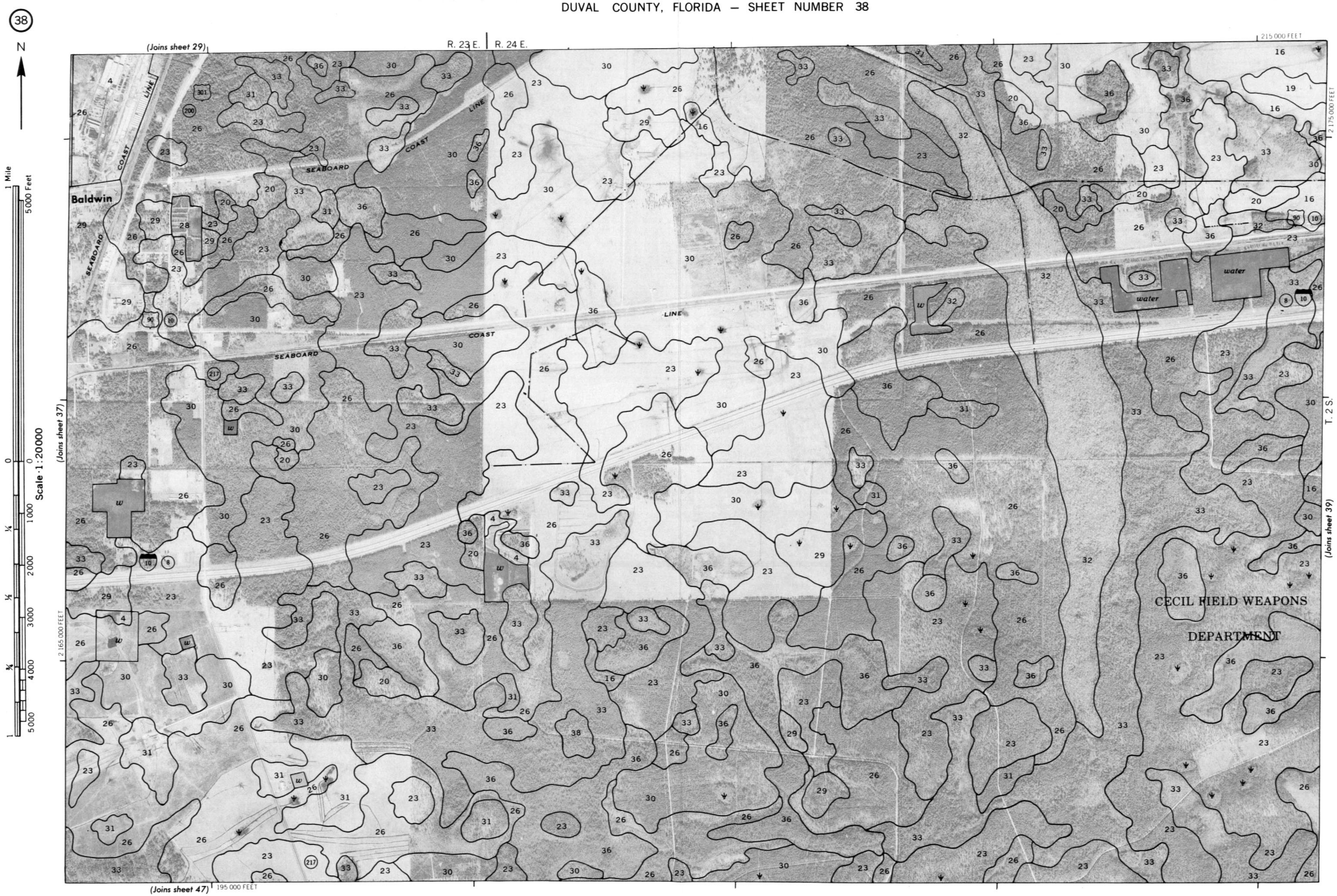

33
N
290 000 FEET
R. 26 E. | R. 27 E.
(Joins sheet 25)
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 42)
2 190 000 FEET
2 180 000 FEET
310 000 FEET
T. 2 S.
LONG BRANCH
Brentwood
Talleyrand
SEABOARD COAST LINE
Hospital
Springfield
JACKSONVILLE UNIVERSITY
ST. JOHNS RIVER
Floral Bluff
Lake Lucina
Eggleston Heights
Post Office
Hogan Creek
Deer Creek
water
JACKSONVILLE
(county seat)
Arlington
MATHEWS BRIDGE
Exchange Island
McCOY CREEK
Brooklyn
ST. JOHNS RIVER
1 Mile
5 000 Feet
Scale 1:20000


N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 26)
R. 27 E.
R. 28 E.
335 000 FEET
ST. JOHNS RIVER
MILL COVE
Gilmore
Lake Effie
Arlington
Holly Oaks Lake
Cowhead Creek
Ginhouse Creek
Jones Creek
Red Bay Branch
Strawberry
CRAIG MUNICIPAL AIRFIELD
Oakwood Villa
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 43)
315 000 FEET
2 190 000 FEET
2 180 000 FEET
T. 2 S.
water

DUVAL COUNTY, FLORIDA — SHEET NUMBER 35


36
N
(Joins sheet 28)
(Joins sheet 35)
(Joins sheet 45)
R. 29 E.
T. 2 S.
375 000 FEET
365 000 FEET
2 190 000 FEET
2 180 000 FEET
1 Mile
5000 Feet
Scale 1:20000
BOATHOUSE CREEK
Boathouse Islands
Cemetery Creek
GARDEN CREEK
CREEK
DE BLIEU
Pine Island
KESTNER CREEK
Crying Child Island
INTRACOASTAL WATERWAY
PABLO CREEK
Oak Harbor
Hopkins Creek
Wonderland
Donner
water
Manhattan Beach
Atlantic Beach
ATLANTIC OCEAN
A1A

N
170 000 FEET
R. 23 E.
(Joins inset, sheet 21)
2 175 000 FEET
T. 2 S.
SEABOARD COAST LINE
Baldwin
NASSAU COUNTY
Deep Creek
(Joins sheet 38)
2 165 000 FEET
18
(Joins sheet 46)
190 000 FEET
1 Mile
5000 Feet
Scale 1:20000


38
N
(Joins sheet 29)
R. 23 E.
R. 24 E.
215 000 FEET
2 175 000 FEET
Baldwin
SEABOARD
COAST
LINE
T. 2 S.
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 47)
195 000 FEET
2 165 000 FEET
water
CECIL FIELD WEAPONS
DEPARTMENT
Scale 1:20000
1 Mile
5000 Feet


39
N
220 000 FEET
R. 24 E. | R. 25 E.
(Joins sheet 30)
2 175 000 FEET
Otis
Halsetoe
SEABOARD
COAST
LINE
McGirts
Creek
T. 2 S.
(Joins sheet 38)
(Joins sheet 40)
CECIL FIELD WEAPONS
DEPARTMENT
2 165 000 FEET
(Joins sheet 48)
240 000 FEET
1 Mile
5 000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000

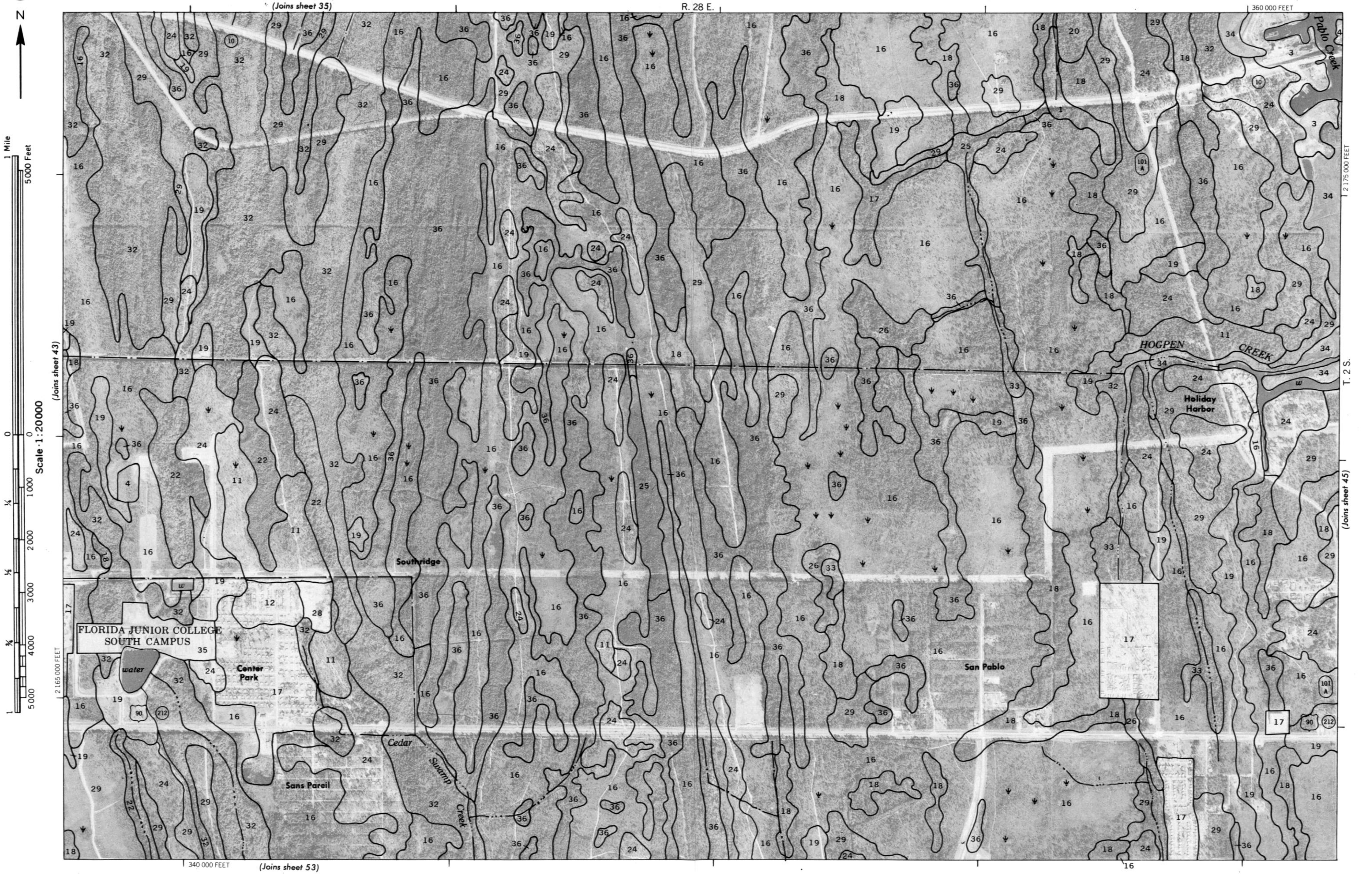
DUVAL COUNTY, FLORIDA — SHEET NUMBER 40


41
N
265 000 FEET
R. 26 E.
(Joins sheet 32)
2 175 000 FEET
T. 2 S.
(Joins sheet 39)
(Joins sheet 42)
(Joins sheet 50)
285 000 FEET
2 165 000 FEET
JACKSONVILLE
Riverside
Winter Point
Murray Hill
Avondale
St. Johns Park
Lake Shore
Sadler Point
ST. JOHNS RIVER
ORTEGA RIVER
ORTEGA BRIDGE
BIG FISHWEIR CREEK
Little Fishweir Creek
Cedar River
SEABOARD COAST LINE
1 Mile
5000 Feet
Scale 1:20000

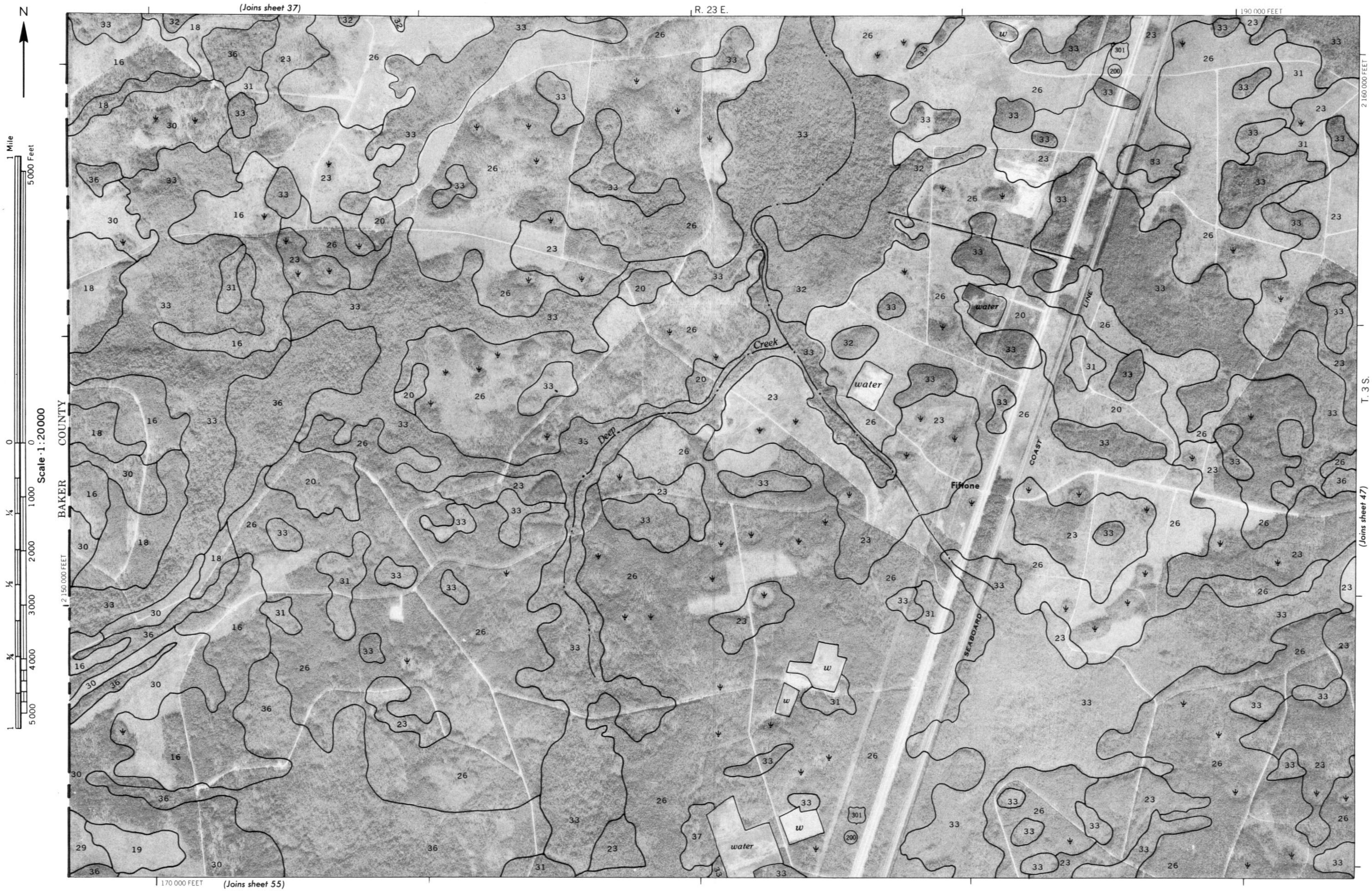
DUVAL COUNTY, FLORIDA — SHEET NUMBER 42

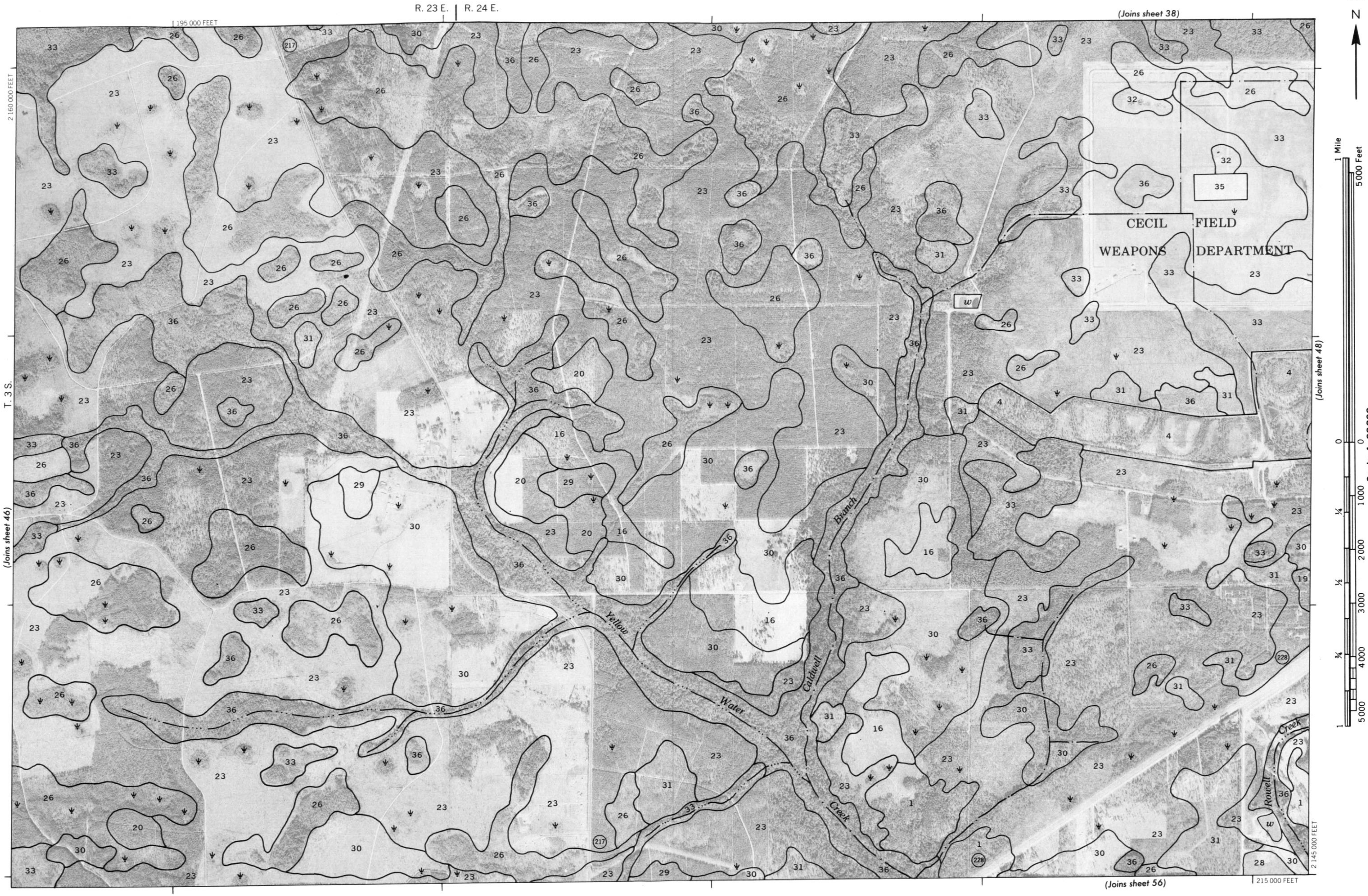
DUVAL COUNTY, FLORIDA — SHEET NUMBER 43

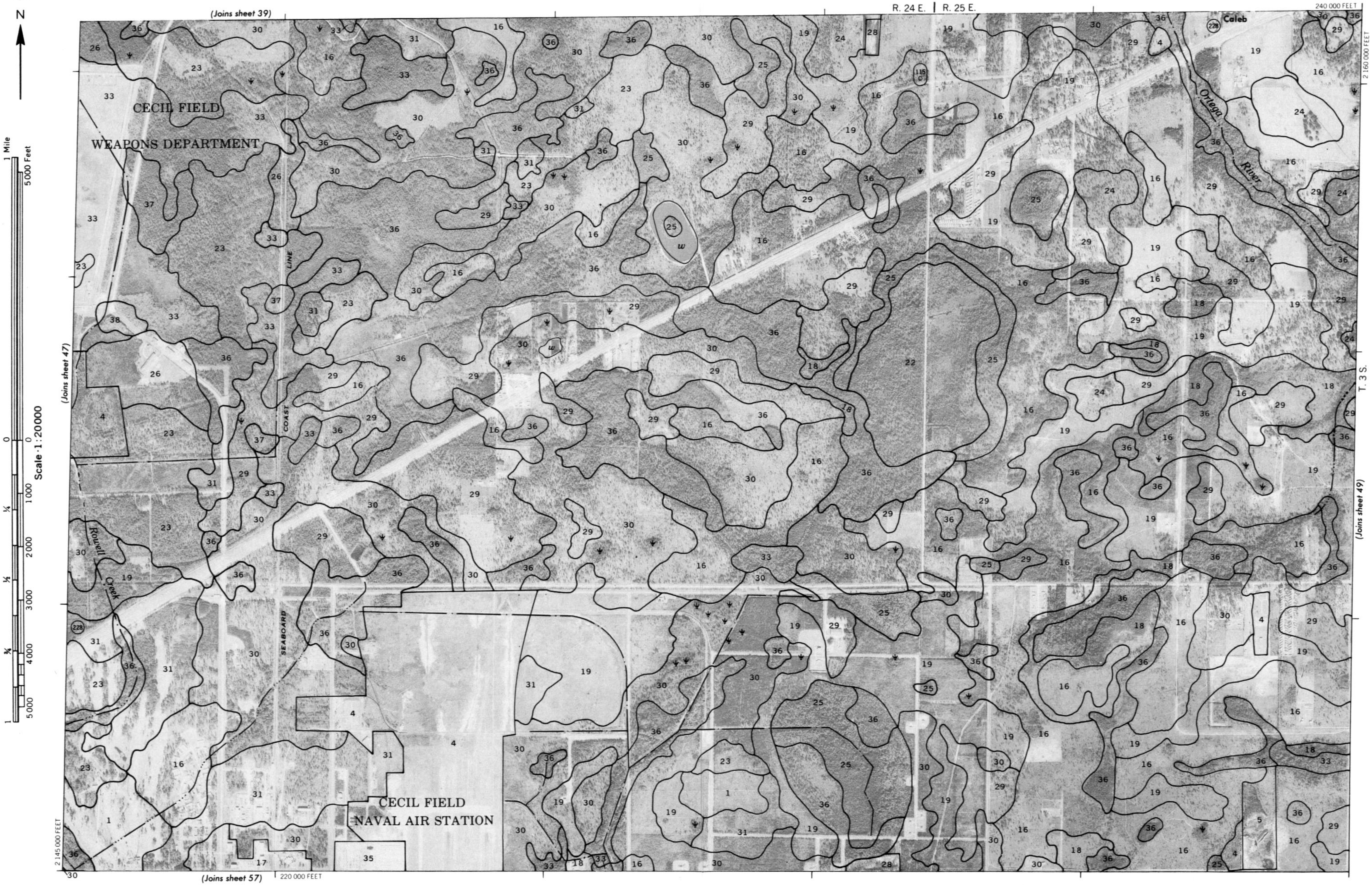
DUVAL COUNTY, FLORIDA — SHEET NUMBER 44

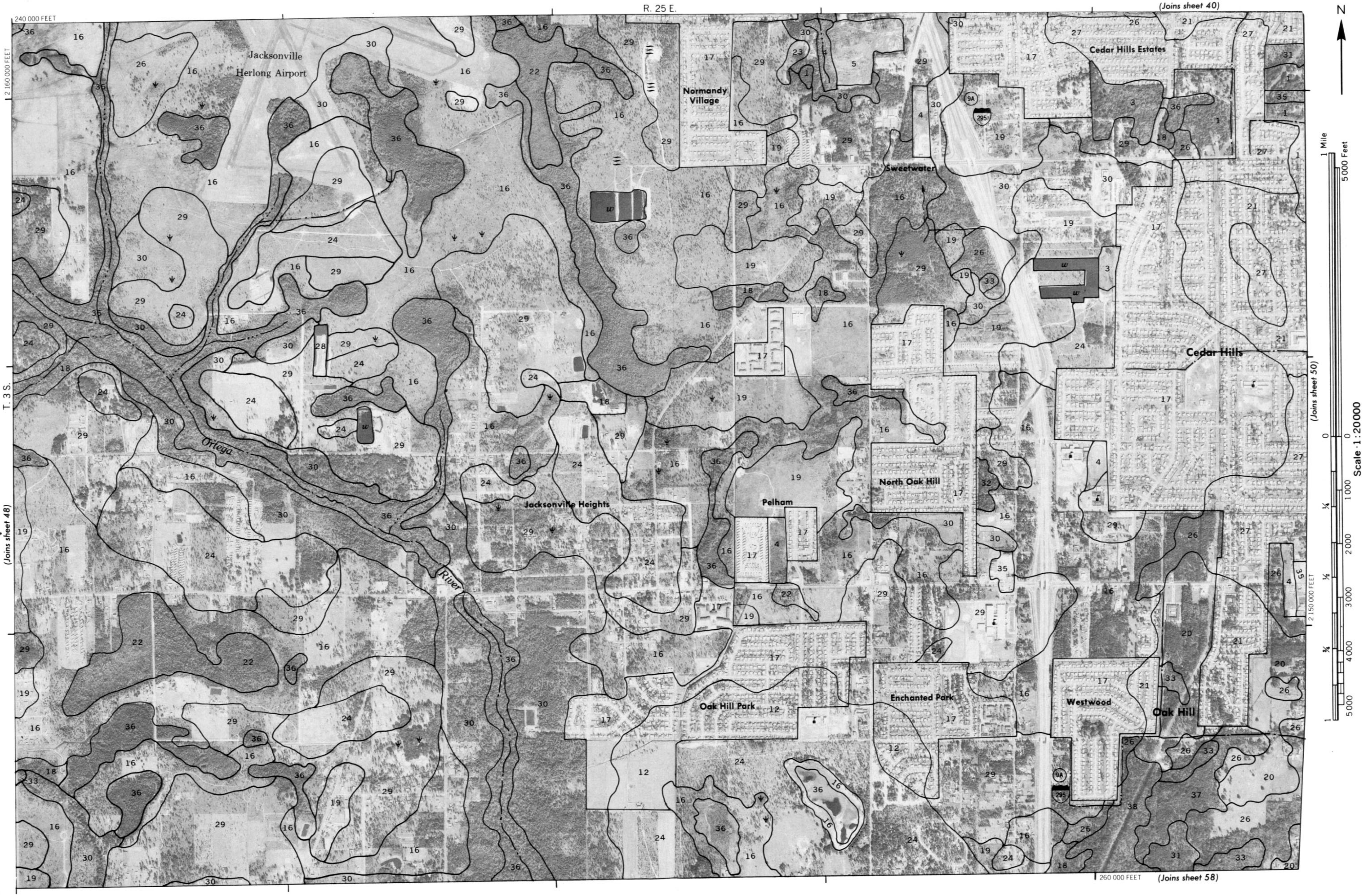



(Joins sheet 36)
(Joins sheet 44)
(Joins sheet 54)
365 000 FEET
375 000 FEET
2 175 000 FEET
2 165 000 FEET
R. 29 E.
T. 2 S.
ATLANTIC OCEAN
PABLO CREEK
INTRACOASTAL WATERWAY
HOGPEN CREEK
Hopkins Creek
Seven Pines Island
Neptune Beach
Jacksonville Beach
Isle of Palms
N
1 Mile
5000 Feet
Scale 1:20000

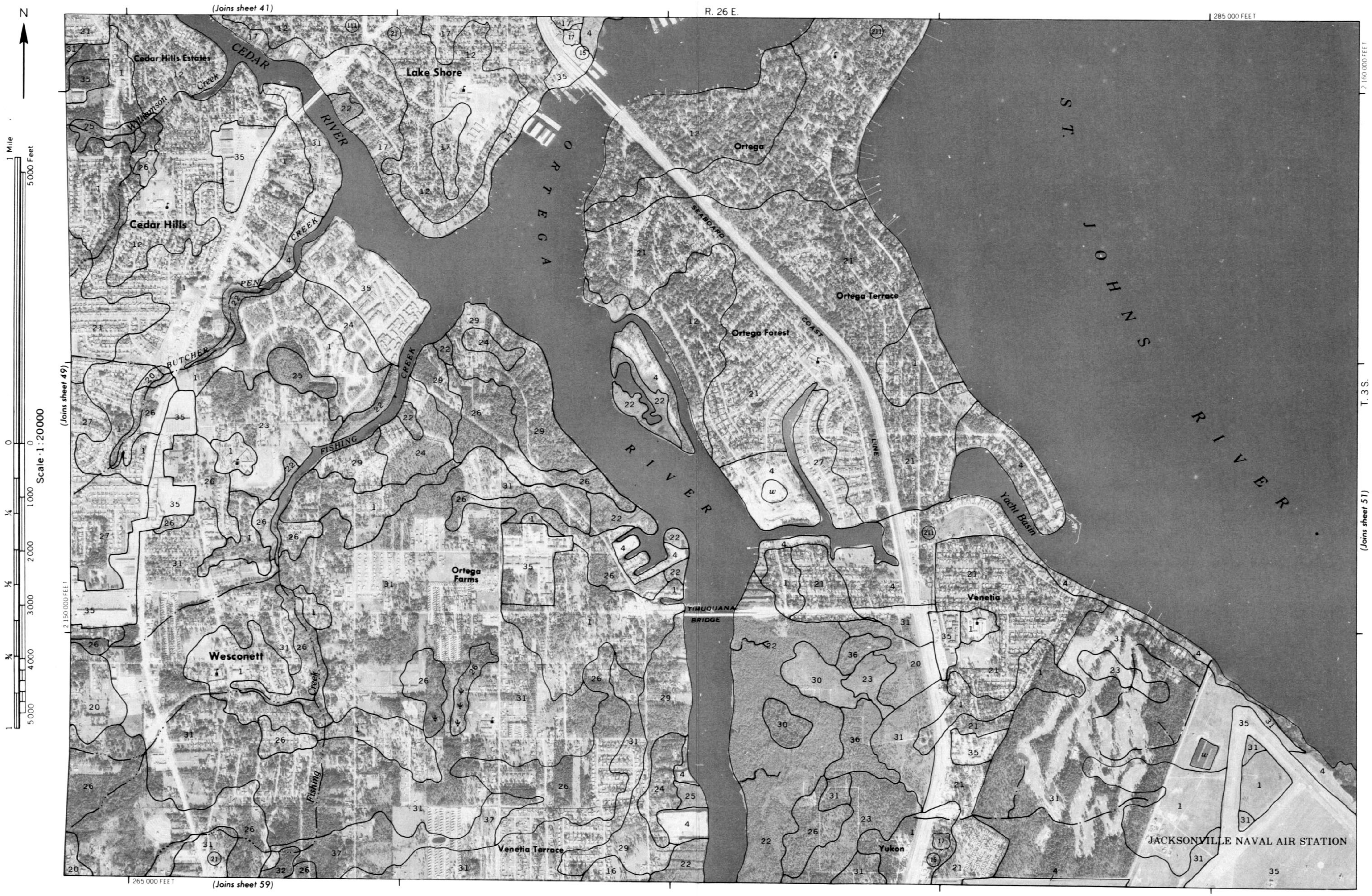

N
(Joins sheet 37)
R. 23 E.
190 000 FEET
2 160 000 FEET
T. 3 S.
(Joins sheet 47)
(Joins sheet 55)
170 000 FEET
2 150 000 FEET
BAKER COUNTY
Scale 1:20000
1 Mile
5000 Feet
Deep Creek
Fiftone
SEABOARD
COAST
LINE
water
301
200


R. 23 E.
R. 24 E.
T. 3 S.
(Joins sheet 38)
(Joins sheet 48)
(Joins sheet 56)
(Joins sheet 46)
195 000 FEET
2 160 000 FEET
215 000 FEET
2 145 000 FEET
CECIL FIELD
WEAPONS DEPARTMENT
Yellow Water Creek
Caldwell Branch
Rowell Creek
N
1 Mile
5000 Feet
Scale 1:20000

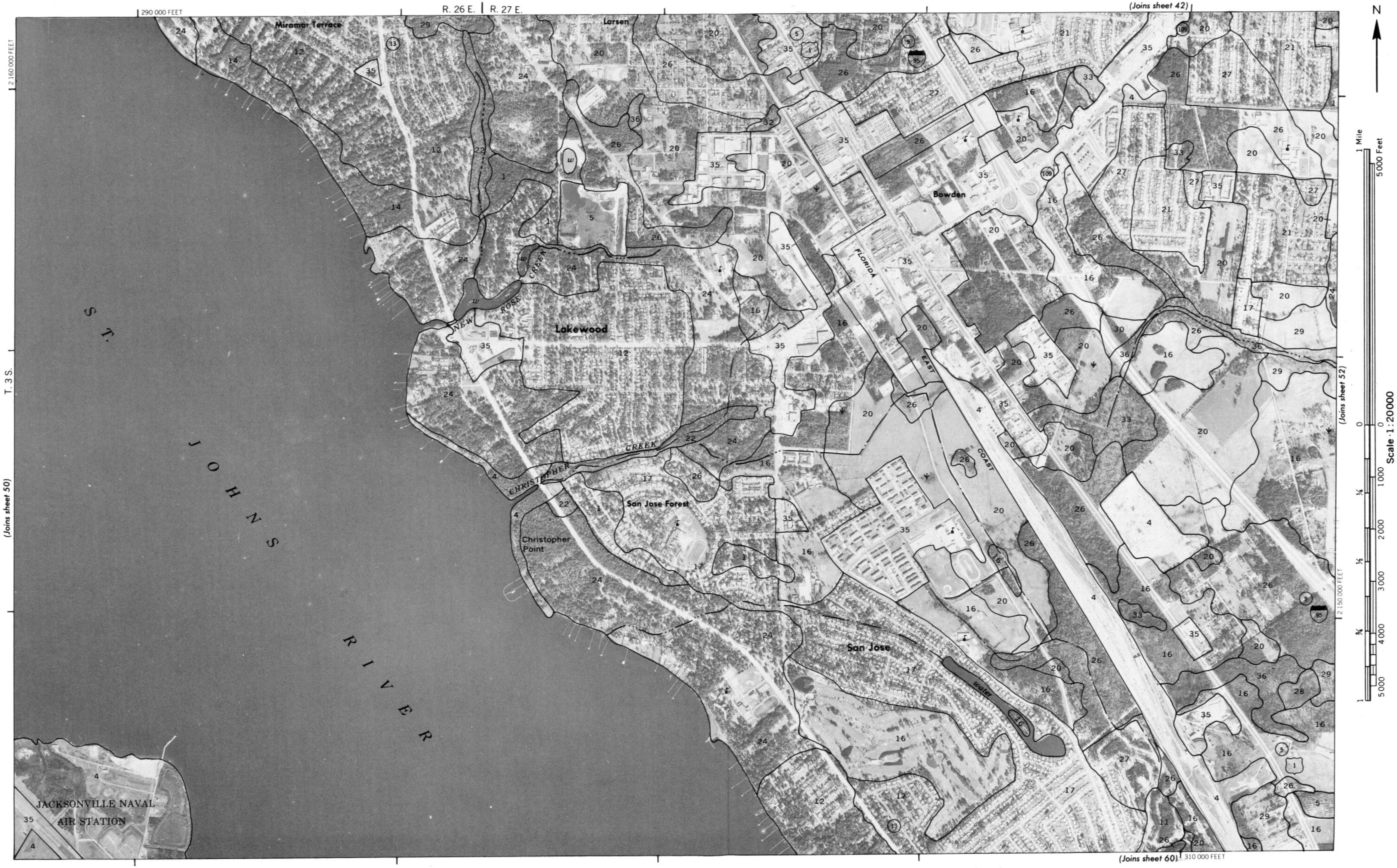

N
(Joins sheet 39)
R. 24 E.
R. 25 E.
240 000 FEET
2 160 000 FEET
Caleb
228
CECIL FIELD
WEAPONS DEPARTMENT
LINE
COAST
SEABOARD
Ortega
River
(Joins sheet 47)
(Joins sheet 49)
T. 3 S.
Rowell
Creek
CECIL FIELD
NAVAL AIR STATION
2 145 000 FEET
(Joins sheet 57)
220 000 FEET
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1


R. 25 E.
(Joins sheet 40)
240 000 FEET
2 160 000 FEET
Jacksonville
Herlong Airport
Normandy
Village
Cedar Hills Estates
Sweetwater
Cedar Hills
T. 3 S.
(Joins sheet 48)
(Joins sheet 50)
Ortega
River
Jacksonville Heights
North Oak Hill
Pelham
Oak Hill Park
Enchanted Park
Westwood
Oak Hill
2 150 000 FEET
260 000 FEET
(Joins sheet 58)
N
1 Mile
5 000 Feet
Scale 1:20000

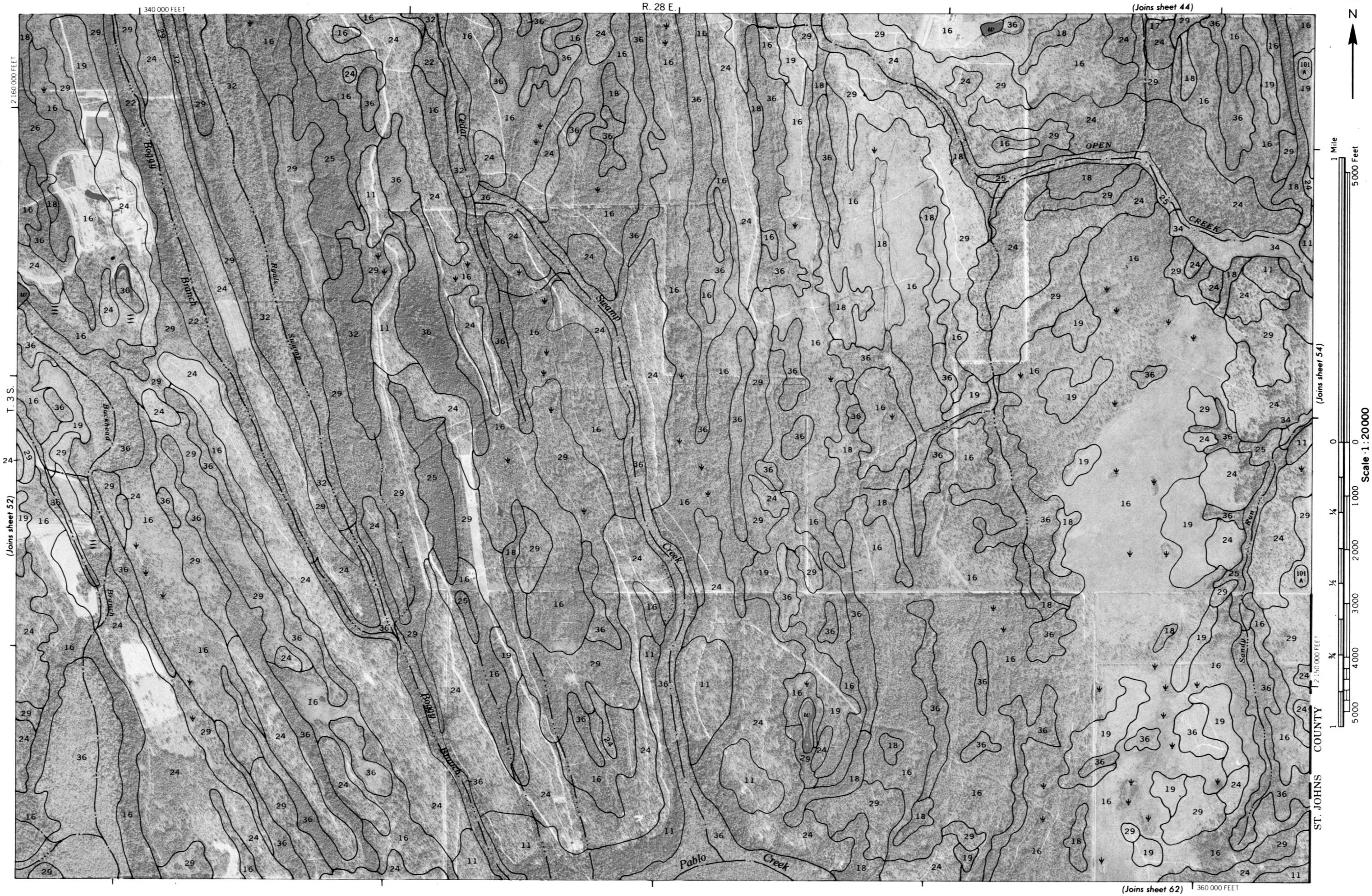
DUVAL COUNTY, FLORIDA — SHEET NUMBER 50



DUVAL COUNTY, FLORIDA — SHEET NUMBER 51



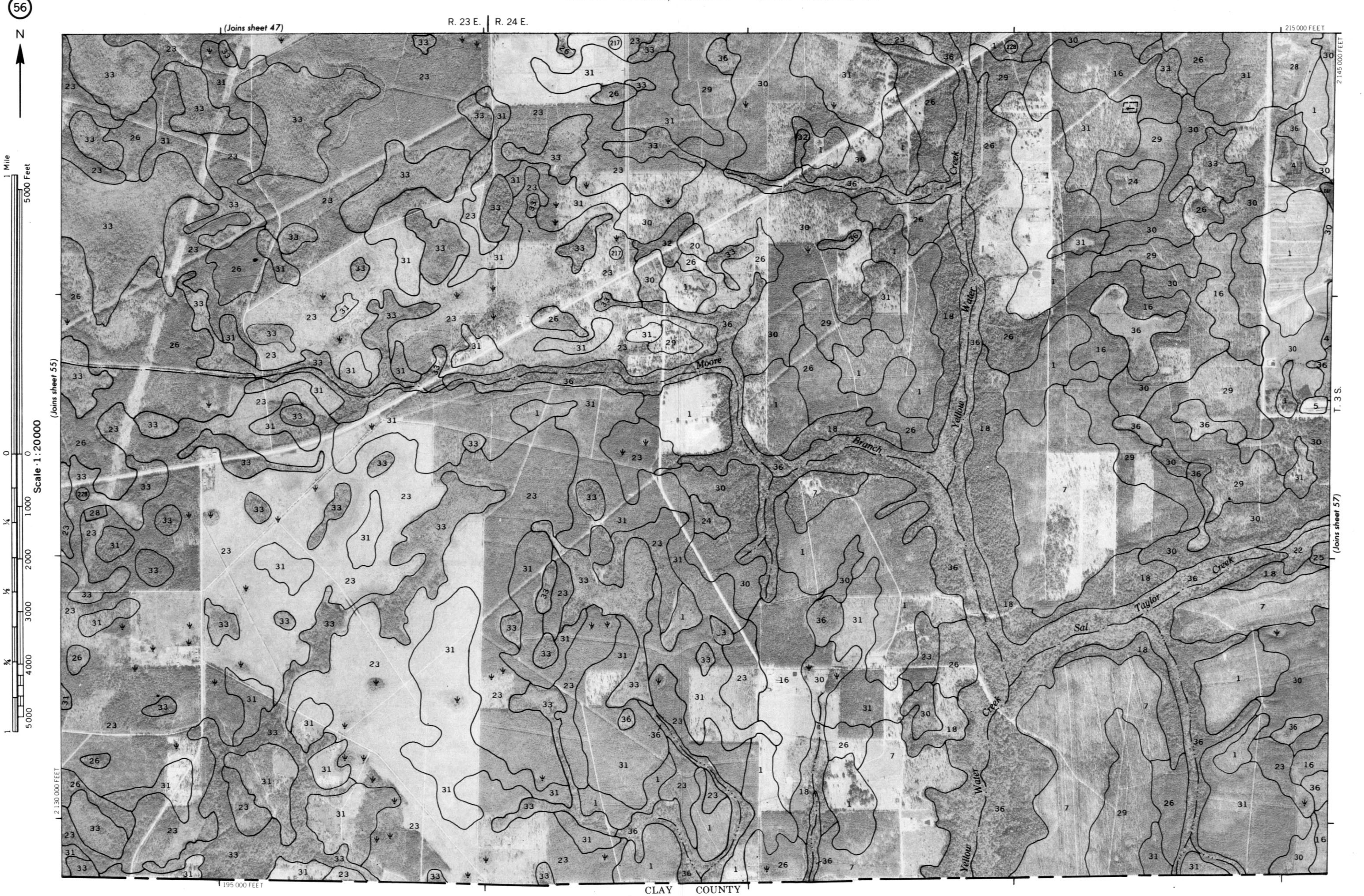
DUVAL COUNTY, FLORIDA — SHEET NUMBER 52


53
N
340 000 FEET
R. 28 E.
(Joins sheet 44)
2 160 000 FEET
Boggy Branch
Cedar Swamp Creek
Rigals Swamp
OPEN CREEK
Buckhead Branch
T. 3 S.
(Joins sheet 52)
(Joins sheet 54)
Sandy Run
Pablo Creek
(Joins sheet 62)
360 000 FEET
2 150 000 FEET
ST. JOHNS COUNTY
1 Mile
5000 Feet
Scale 1:20000

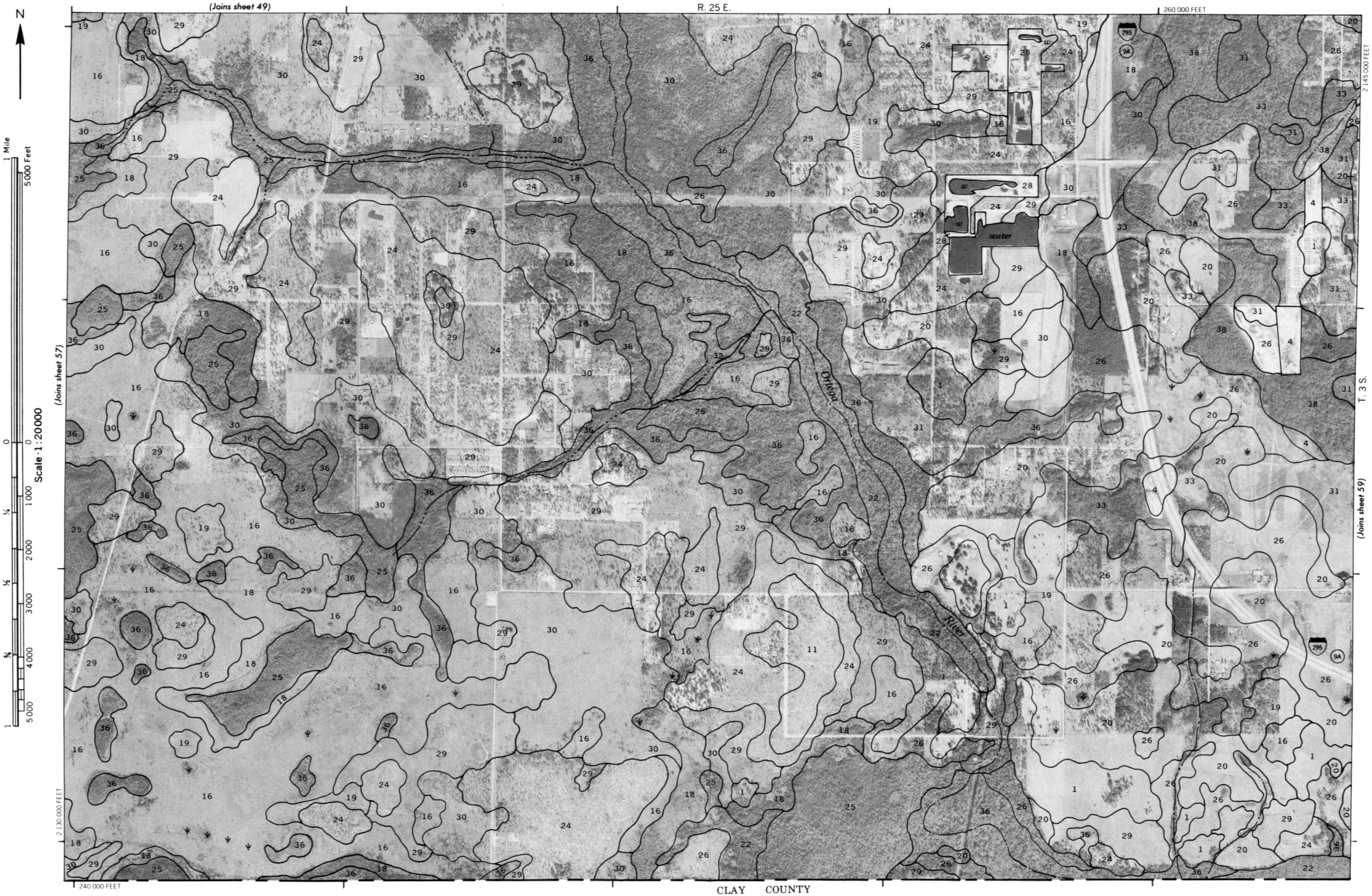

54
N
(Joins sheet 45)
R. 29 E.
385 000 FEET
2 160 000 FEET
T. 3 S.
2 155 000 FEET
365 000 FEET
(Joins sheet 53)
Jacksonville Beach
ATLANTIC
OCEAN
HUGUENOT LAGOON
Lake Duval
Pablo Keys
Isle of Palms South
Beswick Island
Oak Landing
PABLO CREEK
INTRACOASTAL WATERWAY
CRADLE CREEK
OPEN CREEK
CUT CREEK
ST. JOHNS COUNTY
1 Mile
5000 Feet
Scale 1:20 000

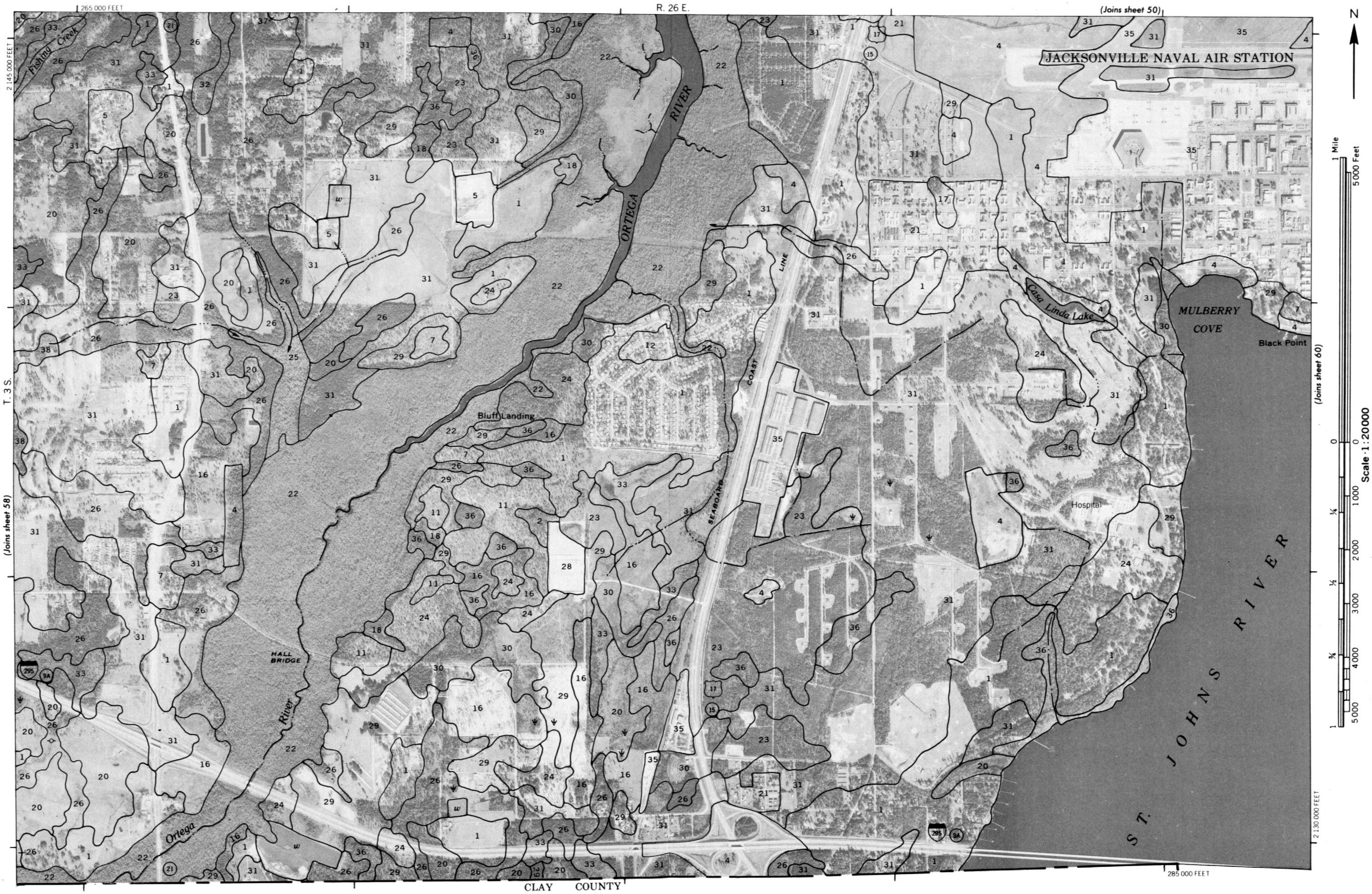

170 000 FEET
R. 23 E.
(Joins sheet 46)
2 145 000 FEET
T. 3 S.
BAKER COUNTY
CLAY COUNTY
(Joins sheet 56)
2 130 000 FEET
190 000 FEET
Maxville
Hugh
Long Branch
SEABOARD COAST LINE
200
301
228
N
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1
Scale 1:20000

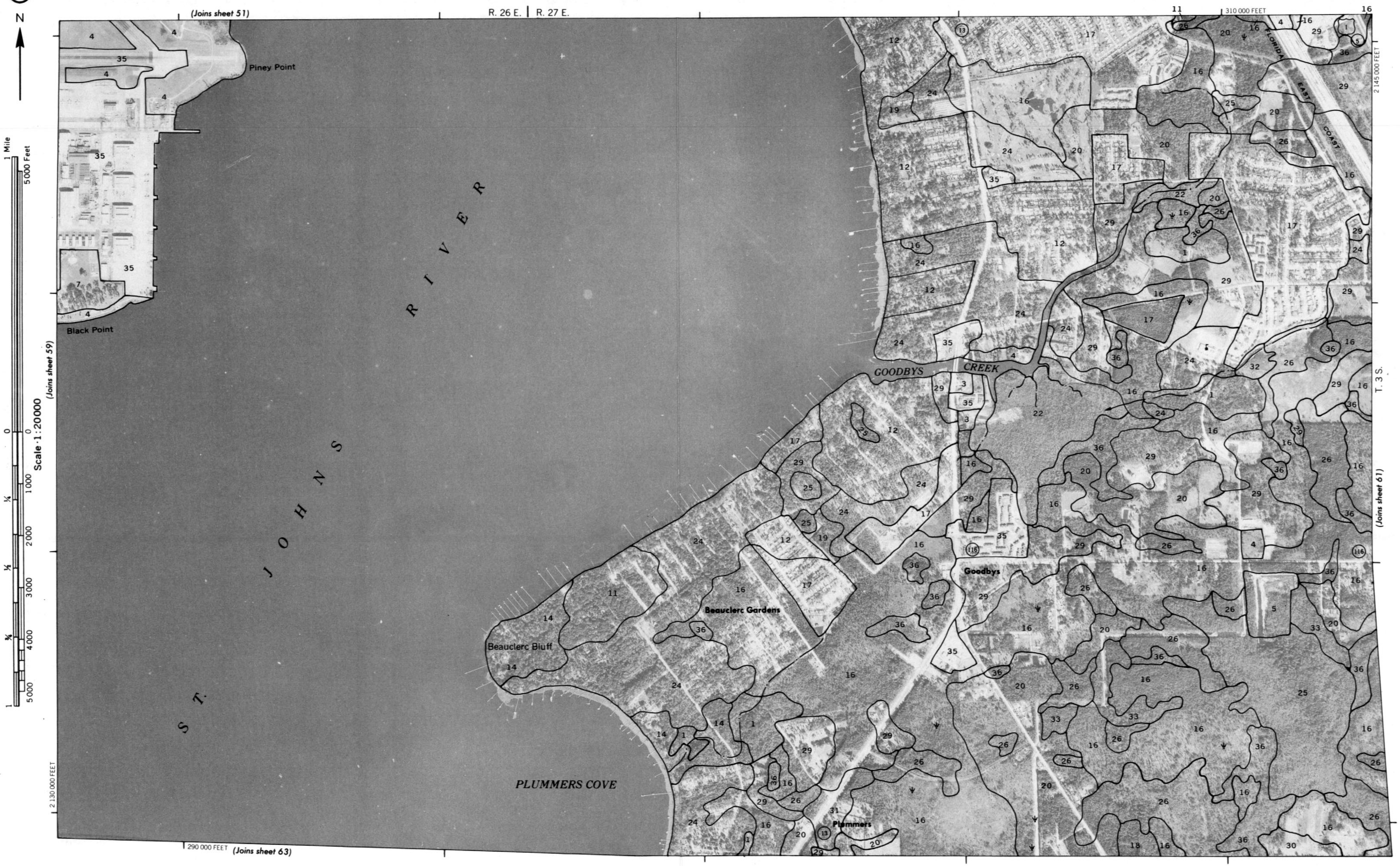
DUVAL COUNTY, FLORIDA — SHEET NUMBER 56



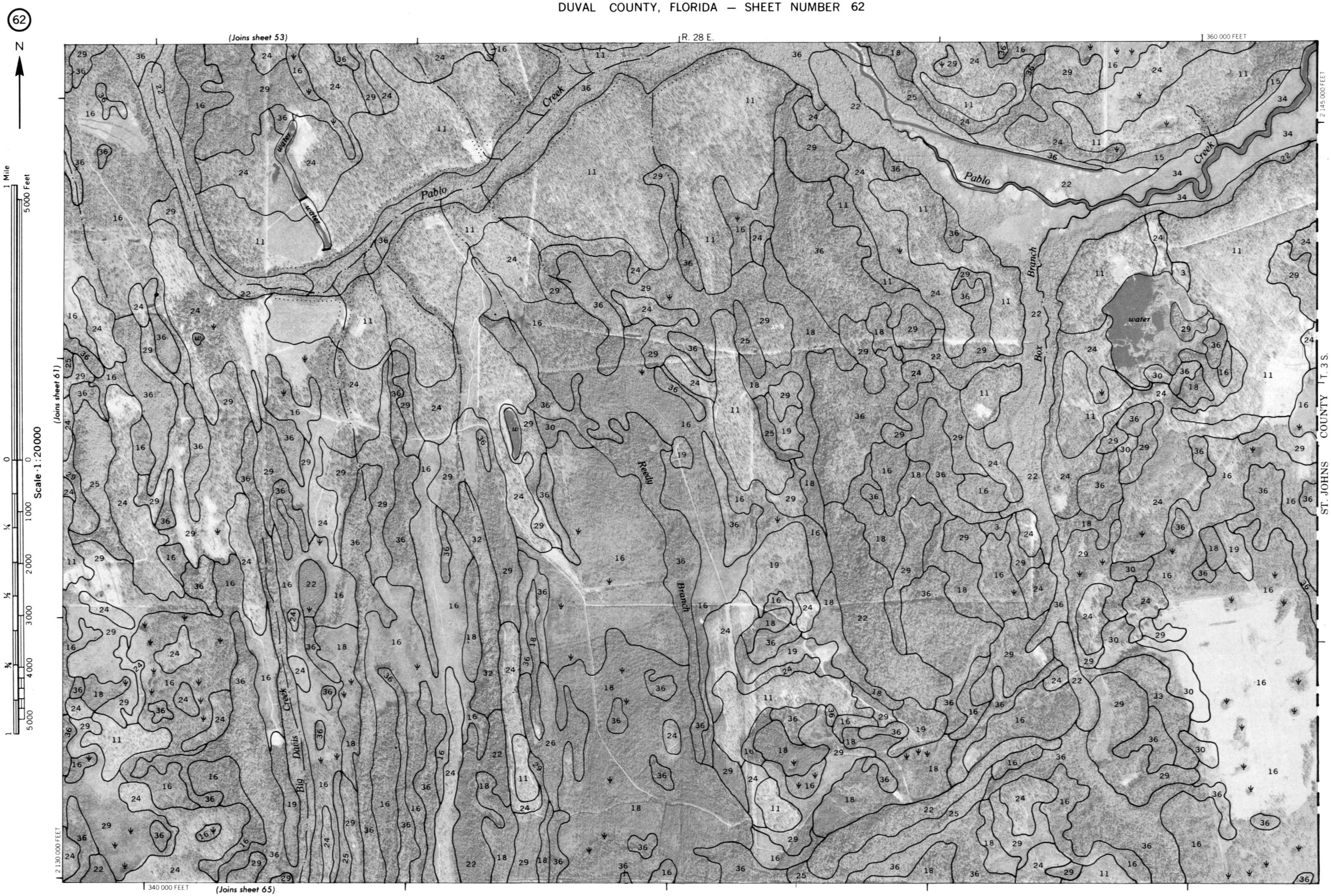

R. 24 E. | R. 25 E.
(Joins sheet 48)
(Joins sheet 58)
(Joins sheet 56)
T. 3 S.
220 000 FEET
235 000 FEET
2 145 000 FEET
2 130 000 FEET
CECIL FIELD NAVAL AIR STATION
Sal Taylor Creek
Rowell Creek
CLAY COUNTY
N
1 Mile
5000 Feet
Scale 1:20000

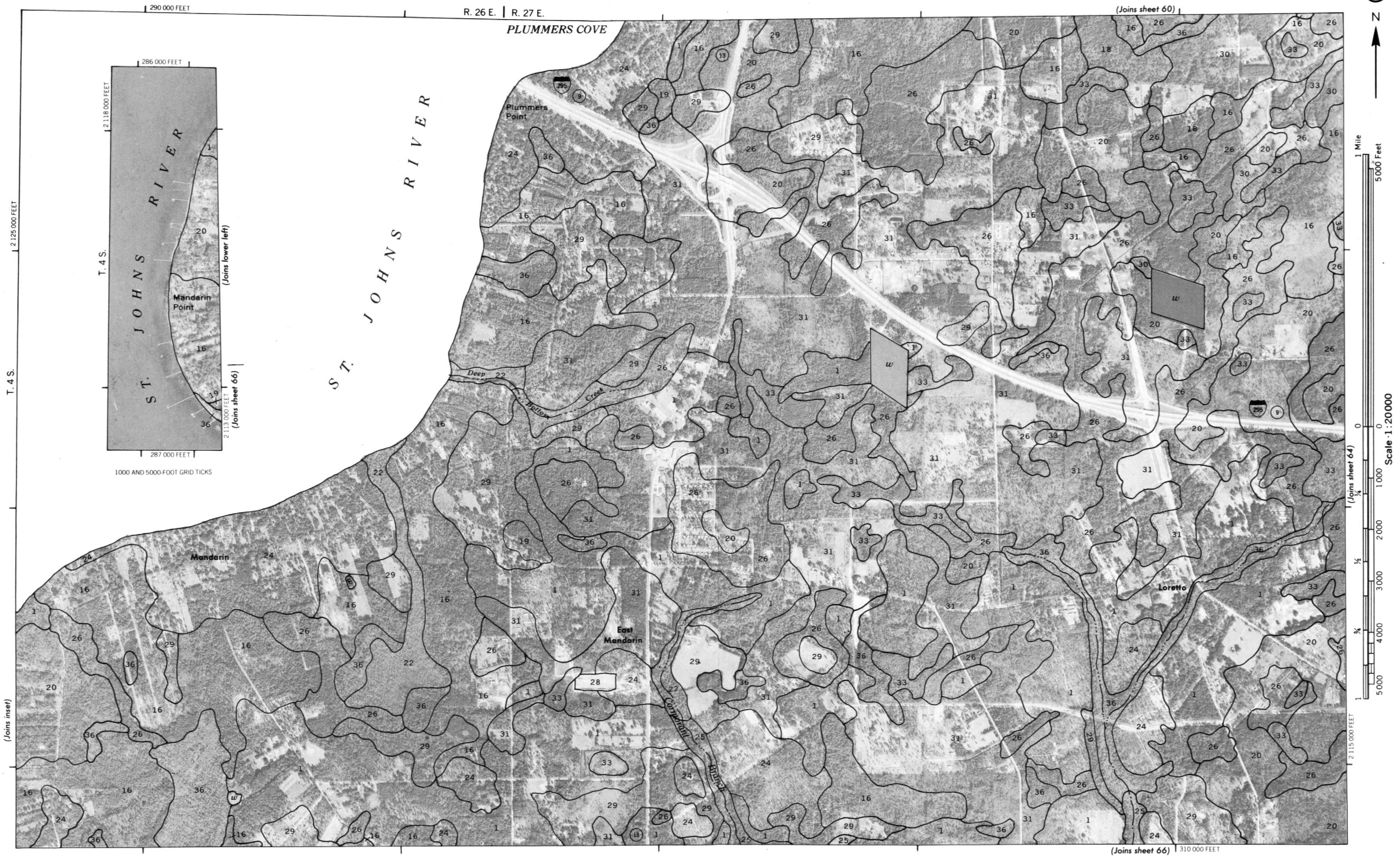

N
(Joins sheet 49)
R. 25 E.
260 000 FEET
2 145 000 FEET
(Joins sheet 57)
(Joins sheet 59)
T. 3 S.
Ortega
River
water
2 130 000 FEET
240 000 FEET
CLAY COUNTY
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1

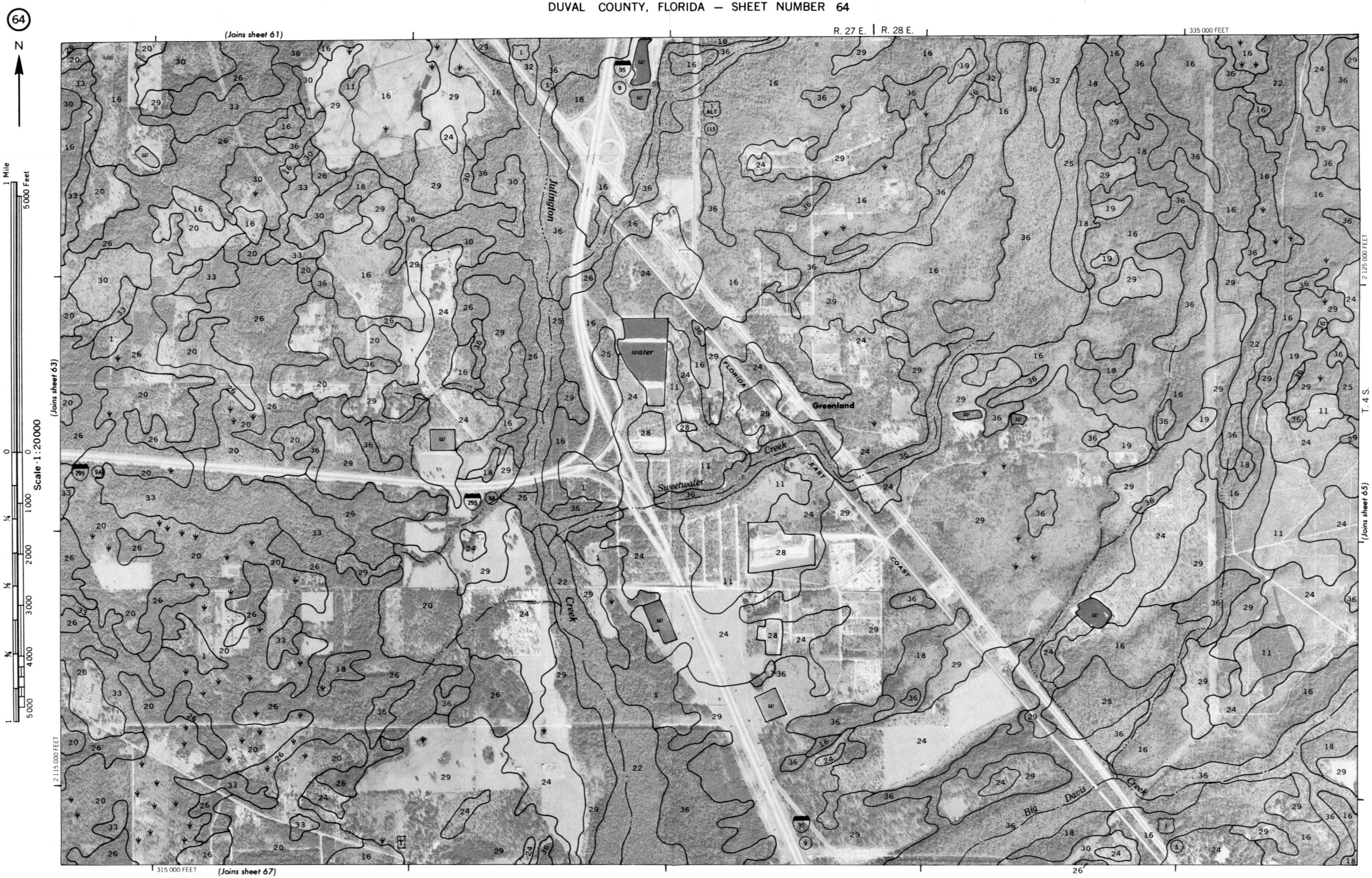

265 000 FEET
R. 26 E.
(Joins sheet 50)
N
JACKSONVILLE NAVAL AIR STATION
2 145 000 FEET
Fishing Creek
ORTEGA RIVER
COAST LINE
SEABOARD
Casa Linda Lake
MULBERRY COVE
Black Point
(Joins sheet 60)
T. 3 S.
(Joins sheet 58)
Bluff Landing
Hospital
HALL BRIDGE
River
Ortega
ST. JOHNS RIVER
2 130 000 FEET
285 000 FEET
CLAY COUNTY
1 Mile
5000 Feet
Scale 1:20000
0
1/4
1/2
3/4
1
1000
2000
3000
4000
5000

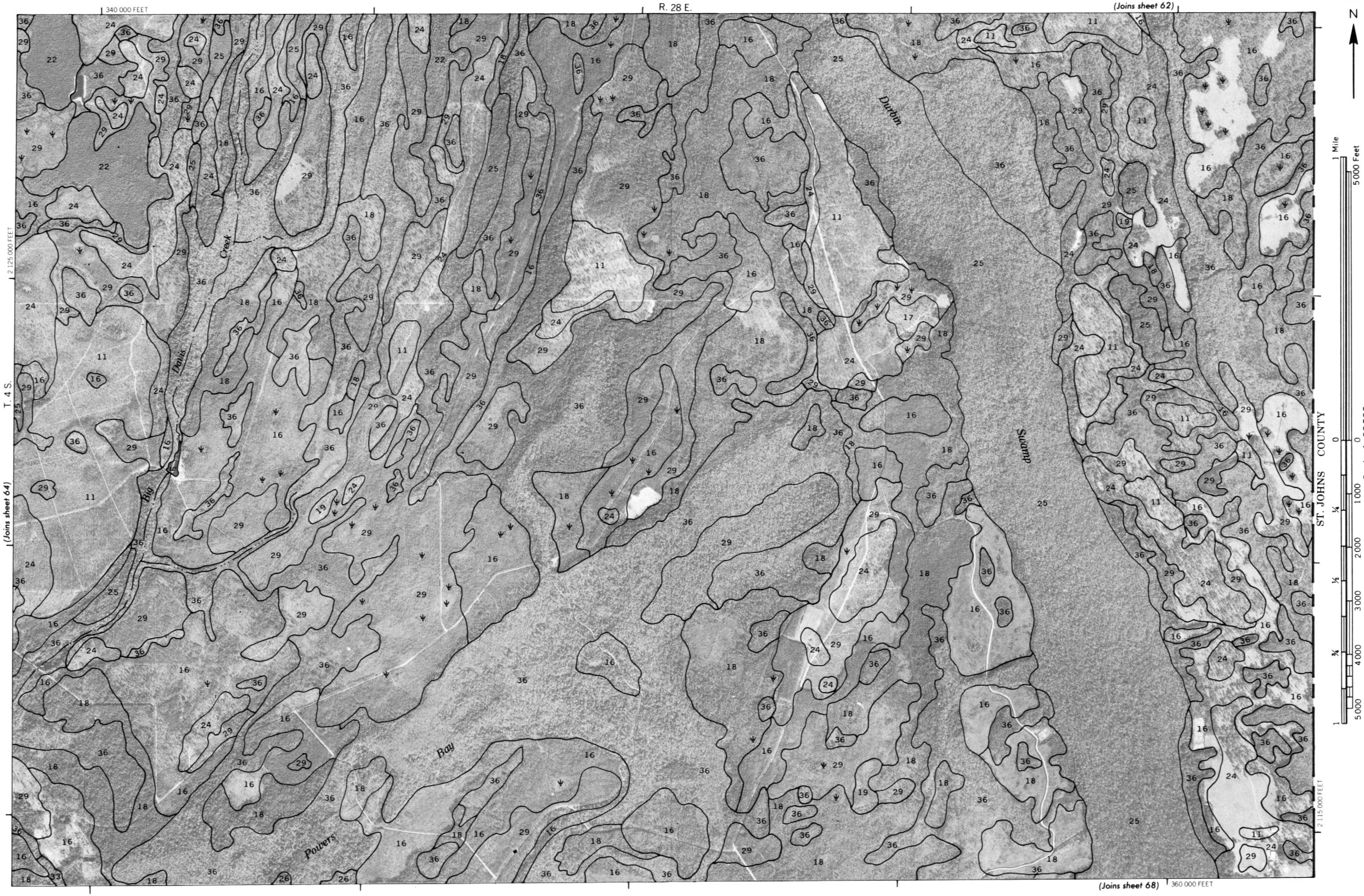

N
(Joins sheet 51)
R. 26 E. | R. 27 E.
310 000 FEET
2 145 000 FEET
Piney Point
Black Point
ST. JOHNS RIVER
GOODBYS CREEK
FLORIDA EAST COAST
Goodbys
Beauclerc Gardens
Beauclerc Bluff
PLUMMERS COVE
Plummers
T. 3 S.
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 63)
290 000 FEET
2 130 000 FEET
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1

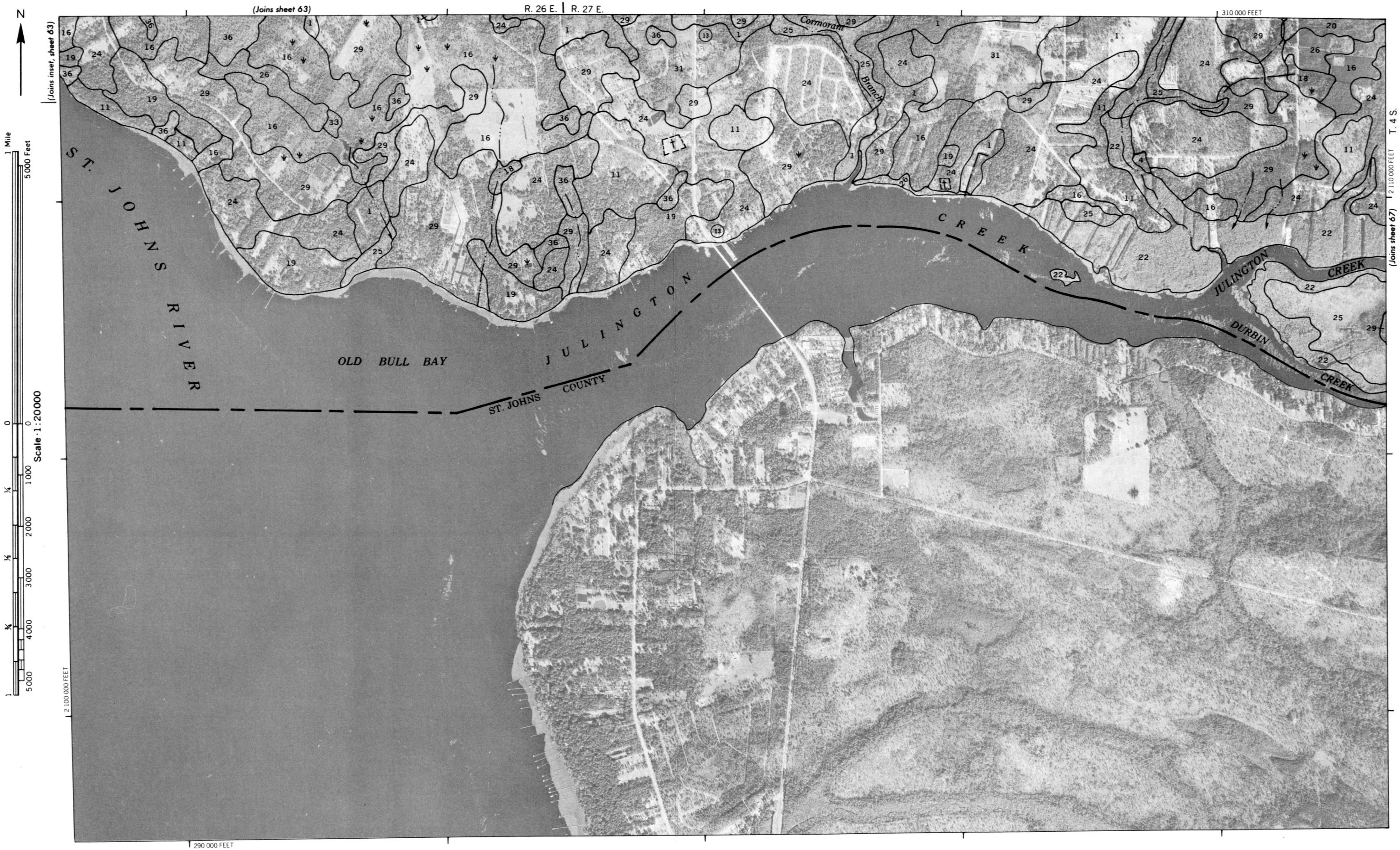

61
N
315 000 FEET
2 145 000 FEET
R. 27 E.
R. 28 E.
(Joins sheet 52)
(Joins sheet 60)
(Joins sheet 62)
(Joins sheet 64)
335 000 FEET
2 130 000 FEET
T. 3 S.
Pottsburg
Creek
Swamp
Deerwood Club
Gun
Swamp
Sunbeam
FLORIDA
EAST
COAST
1 Mile
5000 Feet
Scale 1:20000

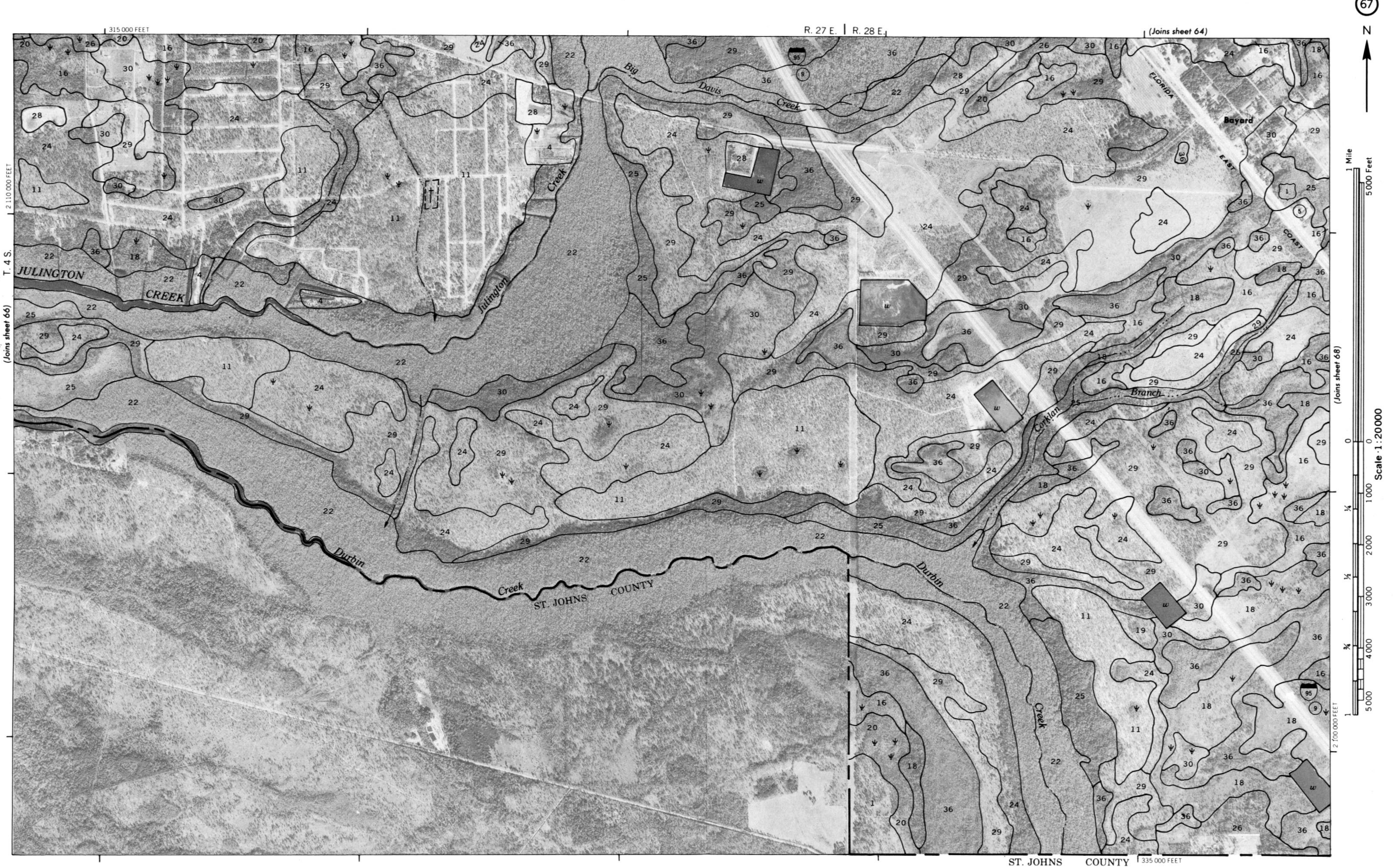

62
N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 53)
R. 28 E.
360 000 FEET
2 145 000 FEET
Pablo Creek
Pablo
Creek
water
Reedy Branch
Box Branch
Big Davis Creek
(Joins sheet 61)
T. 3 S.
ST. JOHNS COUNTY
2 130 000 FEET
340 000 FEET
(Joins sheet 65)


290 000 FEET
R. 26 E.
R. 27 E.
PLUMMERS COVE
(Joins sheet 60)
N
286 000 FEET
2 118 000 FEET
ST. JOHNS RIVER
(Joins lower left)
Mandarin Point
(Joins sheet 66)
2 113 000 FEET
287 000 FEET
1000 AND 5000-FOOT GRID TICKS
T. 4 S.
2 125 000 FEET
Plummers Point
ST. JOHNS RIVER
Deep Bottom Creek
Mandarin
East Mandarin
Cormorant Branch
Loretto
(Joins inset)
(Joins sheet 64)
(Joins sheet 66)
310 000 FEET
2 115 000 FEET
1 Mile
5000 Feet
Scale 1:20000


64
N
(Joins sheet 61)
R. 27 E.
R. 28 E.
335 000 FEET
(Joins sheet 63)
(Joins sheet 65)
2 125 000 FEET
T. 4 S.
2 115 000 FEET
315 000 FEET
(Joins sheet 67)
1 Mile
5000 Feet
Scale 1:20000
Julington
Creek
Sweetwater
Greenland
FLORIDA
EAST
COAST
water
Big Davis Creek


340 000 FEET
R. 28 E.
(Joins sheet 62)
2 125 000 FEET
T. 4 S.
(Joins sheet 64)
2 115 000 FEET
(Joins sheet 68)
360 000 FEET
Big Davis Creek
Durbin Swamp
Powers Bay
ST. JOHNS COUNTY
N
1 Mile
5000 Feet
0
¼
½
¾
1
0
1000
2000
3000
4000
5000
Scale 1:20000


(Joins sheet 63)
R. 26 E.
R. 27 E.
310 000 FEET
(Joins inset, sheet 63)
(Joins sheet 67)
T. 4 S.
2 110 000 FEET
2 100 000 FEET
290 000 FEET
N
1 Mile
5000 Feet
Scale 1:20000
ST. JOHNS RIVER
OLD BULL BAY
JULINGTON CREEK
DURBIN CREEK
ST. JOHNS COUNTY
Cormorant Branch


67
N
315 000 FEET
R. 27 E.
R. 28 E.
(Joins sheet 64)
2 110 000 FEET
T. 4 S.
(Joins sheet 66)
(Joins sheet 68)
JULINGTON
CREEK
Julington
Creek
Big
Davis
Creek
FLORIDA
EAST
COAST
Bayard
Corklan
Branch
Durbin
Creek
Durbin
Creek
ST. JOHNS
COUNTY
ST. JOHNS
COUNTY
335 000 FEET
2 100 000 FEET
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1


N
(Joins sheet 65)
R. 28 E.
360 000 FEET
2 110 000 FEET
(Joins sheet 67)
T. 4 S.
Powers
Bay
Durbin
Swamp
Scrub
Ridge
Ragged
Island
Clarksville
FLORIDA
EAST
COAST
ST. JOHNS
COUNTY
2 100 000 FEET
340 000 FEET
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1